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THE
EXPECTANT MOTHER

BY

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ILLUSTRATED

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TO
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PREFACE

THIS book is written in the hope that it may serve to explain in simple language many of the processes which relate to pregnancy, labor and the post-partum period. The thought has been not of pregnancy and labor alone, but of the mother; hence those sections dealing with puberty and the adolescent girl, many pages of which have been taken from the author's work on Medical Gynecology. This period of life, plus the element of internal gland secretions, has very much to do with the prospective mother and has some bearing on the question of Eugenics. Doctors, nurses and intelligent members of the laity have a common interest in these facts. A clearer insight into woman's sphere, better care, and greater watchfulness over all our patients are the great hopes of the future. This book is only a slight addition to those works which enlighten intelligent minds on questions and matters which they should understand.

S. W. BANDLER.

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THE EXPECTANT MOTHER

THE FEMALE REPRODUCTIVE ORGANS

The female reproductive organ comprises: *the uterus* (or womb), from which pass out *the Fallopian tubes*, to which are attached *the ovaries*. The entrance canal to the uterus is called *the vagina*.

THE OVARIES

At about the middle of the course of each tube, below and posterior to it, is situated a gland the size of a prune, one on either side. These are the ovaries. Each is attached to the womb by a ligament. They produce the eggs, or ova, which constitute the female contribution to impregnation (Fig. 1).

Each ovary contains thousands of these ova or eggs in a quiescent state. They consist of a single layer of cells within which lies the ovum. Each month, when an ovum is about to ripen in one of the ovaries, fluid accumulates within the single layer of cells, the cells begin to increase tremendously in numbers, and, at one point in the interior, cells are piled up around the ovum. The whole is called a Graafian follicle, and the fluid within is called liquor folliculi. As the liquor folliculi increases in amount, the follicle approaches, by its increase in size, nearer and nearer to the surface of the ovary, until only a thin layer separates it from the abdominal cavity. This thin layer breaks, and the ovum with the cells around it, is discharged into the peritoneal cavity. The space, or small

cavern, left in the ovary after the bursting of the follicle, fills with blood, and heals up. It is then called a *corpus luteum*, and heals very quickly and disappears if no pregnancy takes place. It does not heal up and disappear if pregnancy occurs, but continues to grow and manufacture a great deal of yellow cell structure which gives it the name of true corpus luteum (yellow body).

During pregnancy this corpus luteum continues to grow for a certain period. It sends a secretion into the blood which is supposed, among other things, to act on the ovaries and prevent more eggs from ripening during pregnancy.

FIG. 1.—A diagrammatic sketch of the ovaries showing the various stages of development through which a Graafian follicle goes. It consists at first of an ovum surrounded by a single layer of cells. As it grows there is an accumulation of fluid within the follicle. It thus approaches the surface of the ovary. The ovum is at one part of the circumference of the follicle. As the follicle gradually approaches toward the surface of the ovary, by an accumulation of fluid within it, it bursts and the ovum is discharged.

It also accelerates the growth of the uterine lining (endometrium).

There are many cases where the Graafian follicles do not break through the outer covering of the ovary. Either it is too tough, or the eggs and follicles are not virile enough and the follicle lacks "the punch." It often happens that, for this reason (inflammations also cause like changes) the ovaries are full of unbroken follicles, which are then called atresic follicles or retention cysts. These may be so numerous that they cover the outer areas of the ovaries, and no deeper eggs can be sent out, and the patient is sterile. In this class of cases, operations which cut away the outer part

of the ovaries and thus let the deeper ova have an outlet, often cure sterility.

In some cases the ovaries do not produce ripe ova, and this may be a cause of sterility. If inflammation has taken place in or about the ovaries, they may be so surrounded by a veil of adhesions that the ovum or egg produced by each Graafian follicle may not be discharged into the peritoneal cavity to be carried into the tube, even though the tube be patent and open at its outer end.

There are certain diseases, due to changes in some of the glands producing internal secretions, which act so deleteriously on the ovaries that their function is disturbed and they produce no ova at all or produce only unripe ones. Unless ripe ova are produced and expelled from the ovary, no pregnancy can take place.

Passage of Ovum from Ovary to Womb.—The ovum, when discharged from the Graafian follicle into the abdominal cavity, rests on some part of the peritoneally covered organs or areas of the pelvis, the surface of which is moist as a result of a serous fluid present in the abdominal cavity.

The tiny microscopic ovum soon experiences a tendency to be drawn to either the right or left side, toward the abdominal end of the tube, because of the constant action of the cilia within the lumen (canal) which causes a current, the effect of which is felt far beyond the limits of the tube. If the tube be open, and if the ovum find itself free, after expulsion from the ovary, it will enter the tube on one side or the other, provided that the ciliated epithelium is normal. The ovum thus reaches the uterus. It is expelled from the uterus unless impregnation takes place, in which event it usually settles at some part of the endometrium (lining of the womb) which is prepared for its reception by a special process (see p. 19). In many cases the outer end of the tube

is open, and the ovum is drawn into the tube, but in the lumen or canal of the tube, as the ovum continues its course toward the uterus, there may be little blind branches into which it goes and remains. Or again, there may be barriers in the tube, produced by mild inflammation, which prevent the ovum from going further. In some cases the tubes may be twisted or bent by inflammation about them, so that the course of the ovum is barred. Unless the lumen of the tube is sufficiently open from the outer end to the uterus, unless the cilia are active, the ovum cannot reach the uterus. These various changes cause sterility, or in many cases ectopic gestation.

THE FALLOPIAN TUBES

The tubes, called Fallopian tubes, are the size of a small quill, about 4½ inches long, and extend out from either lateral corner of the fundus (body of the womb) in much the same way that the fully extended arms pass out from the body at right angles. They are composed of muscle fibers, are lined with a mucous membrane, and are covered with peritoneum, the same tissue that lines the abdomen and covers all the intra-abdominal organs. On the posterior aspect of each tube, at its middle, rests an ovary, which is attached to the uterus by a ligament. The outer end of the right tube is not far from the appendix (Fig. 2). The inner end of each tube passes into and through its corresponding corner of the uterus and opens out into the endometrium. As the inner end passes through the upper part of the womb (Fig. 3), it is extremely narrow, scarcely admitting more than a horse hair. The tube is tremendously larger at the outer end. This outer or abdominal end is trumpet-shaped, and has folds or pleats in its lining, so that the mucous membrane lining it

is of great circumference. On this tubal lining are innumerable cilia which are always waving toward the uterus, so that anything within the abdominal cavity, which is not of too great size, may be whisked along through the tube into the uterus.

If the tube be congenitally too small, it will not serve to carry ova into the uterus. If inflammation has taken place in the tubes or about the tubes, the lining may be so altered that the lumen (canal) is obstructed. If inflammation has so affected the outer trumpet-shaped end

FIG. 2.—The ovaries and the Fallopian tubes, one on either side. The Graafian follicle is filled with fluid, is close to the surface of the ovary and about ready to burst and discharge its ovum. The Fallopian tubes have an outer trumpet-shaped end. They are lined with a mucous membrane, on the inner surface of which is a lining of cells known as ciliated epithelium. These cilia are continually waving toward the uterus, creating a current in that direction. The effect of this current is felt far out beyond the outer end of each tube.

that the tubes become adherent to some part of the pelvic contents, or if the outer ends become agglutinated and closed, no ovum can enter the tube. In certain diseases of those glands producing internal secretions, including the ovaries, the cilia or tails in the tubes do not act. All these abnormalities cause sterility.

THE UTERUS

The uterus is a hollow, pear-shaped muscular organ which is suspended in the pelvic cavity. It is about 3½ inches in length, and is composed of an upper, large part called the *fundus*, and a lower, narrow part called the *cervix* (neck)

(Fig. 3). A mucous membrane called the endometrium lines the fundus and the cervix. Very small glands located in the endometrium secrete, in normal conditions, a liquid which keeps the lining moist. The secretion from the fundus glands is thin and colorless, and resembles that secreted by the mucous membranes elsewhere in the body. That from the cervix glands is, on the contrary, thick, glairy and colorless, and usually remains in the cervix where it may be said to act as a sort of plug.

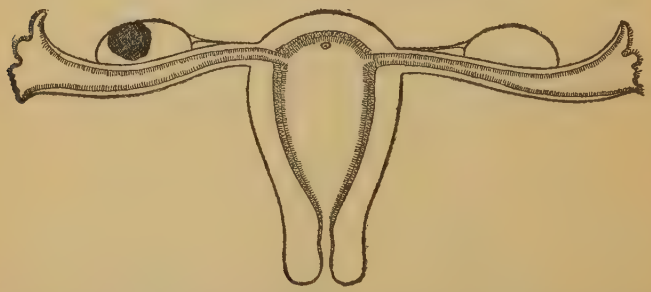

FIG. 3.—The ovaries, the Fallopian tubes, each of which enters into one corner of the uterus, and the uterus. The uterus serves as a nest for the ovum which when discharged from the Graafian follicle is carried by the cilia through the tubes into the uterus. The dark area in the ovary shows that a follicle has burst and that its cavity is filled with blood. The ovum has passed through the tube and is in the uterus, whence it is discharged if not impregnated. The uterus has a lining called endometrium. This is lined with cilia waving toward the cervix. The upper part of the uterus is called the fundus, the lower is called the cervix.

On the endometrium are numerous little hair-like or tail-like bodies called *cilia*, which have a continuous, waving movement in the direction of the cervix. There is thus produced a constant current toward the cervix. It tends to prevent the upward extension of any substances, microscopic or otherwise, from the vagina into the cervix, and from the cervix into the fundus.

The purpose of the uterus is to act as the nest for an

impregnated ovum. In order to serve as a welcoming nest, the lining of the uterus (endometrium) must be smooth. If the lining be abnormal in character, as a result of inflammation, of overgrowths, or of new growths, it may not form a suitable resting place for the ovum.

THE VAGINA

The vagina is the canal which connects the external genitalia with the neck of the uterus, which protrudes

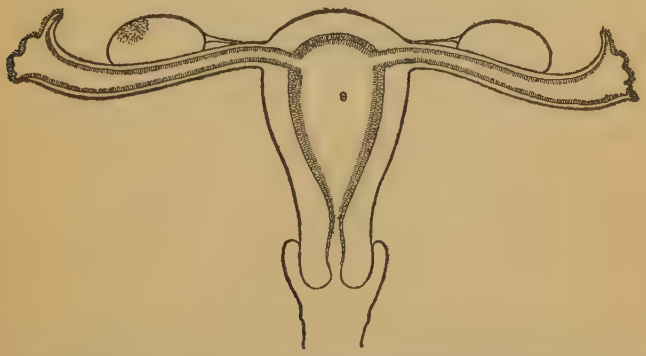

FIG. 4.—The ovaries, the two Fallopian tubes, the uterus and the vagina. Into the vagina, the lower end or neck of the uterus, known as the cervix, projects. The appendix is mentioned to recall its close relation in the matter of position, to the right tube and ovary. If the ovum is not fecundated the Graafian follicle gradually heals up, eventually leaving only a scar.

through the upper, closed end of the vagina. The upper end, or "roof" of the vagina, through which the cervix protrudes, is called the *fornix* and we speak of an anterior fornix, a posterior fornix and two lateral fornices (Fig. 4). The posterior fornix is the largest, and is deep. The posterior fornix forms, when the individual is lying on her back, a slight cup or reservoir, into which the cervix dips. The spermatic fluid is deposited in the vagina (Fig. 5).

If the vagina be the seat of inflammation, or if it produce or receive secretions of an abnormal character, it may not prove to be a welcoming reservoir for the spermatozoa. In some cases, the posterior fornix may be shallow. If it does not form a little cup or reservoir for the spermatic fluid, this fluid will run out. Under these various circumstances

FIG. 5.—A lateral section of the uterus and the vagina, showing the curve in the canal of the uterus; showing how the lower end of the uterus, known as the cervix, dips into the hollow area of the vagina, known as the posterior fornix. In this posterior fornix the spermatic fluid of the male is deposited. The cervix dips into this fluid and the spermatozoa by their own activity have the opportunity of moving up through the cervix into the uterus and out through the Fallopian tubes.

the purpose of the posterior fornix is lost. Its purpose is to furnish a haven from which the important elements contained in the spermatic fluid may find easy entrance into the womb. Hence, in a small proportion of cases these abnormalities of the vagina may cause sterility by destroying the spermatozoa, or by expelling them from the vagina.

MENSTRUATION

Every month, a few days before the expected menstrual period, the lining of the uterus (endometrium) grows much thicker, and the cells grow much larger. This change in the uterine lining is produced by the secretion of the ovaries, which circulates in the blood, and which has a specific action in producing this change in the lining of the uterus. The ovarian secretion is the guardian of the uterus.

This change is produced so that the egg, when it enters the uterus, may find a thick, mossy lining on which to rest, and in which it may imbed itself. As previously explained (p. 17) the purpose of the uterus is to act as a nest for the impregnated ovum. If it settles in this lining, it grows within the uterus for a period approximating two hundred and eighty days.

When, each month, the uterine lining swells in preparation for the reception of a fecundated ovum, and when, each month, in association with this procedure, the blood-vessels of the uterus and of the uterine lining become tremendously engorged with blood, a state exists wherein a great deal of tension or pressure is exerted upon the vessels.

If a fecundated ovum enters the uterus and imbeds itself in the endometrium, now called the *decidua*, menstruation does not occur, because the now growing ovum, through some secretion which it throws into the circulation, or through some action which it exerts locally, inhibits the tendency of the blood-vessels to break, and prevents what is known as menstruation.

All this preparation is produced by the secretion of the ovaries. If no impregnated ovum settles in the uterus to keep this process in continuation, then there is a breaking of the little capillaries (or minute vessels), and blood is poured out into the uterine cavity and out through the neck of the womb and vagina, into the outer world. The lining is not thrown off, only blood is lost.

This procedure whereby the swollen and turgid lining of the uterus is relieved of this extra amount of blood is known as *menstruation*. Therefore menstruation is a sign that no pregnancy exists. (Exceptions occur, but are rare.) In other words, in the human race, the womb prepares itself every twenty-eight days for the nesting of an impregnated ovum, and if this does not occur, then the swollen lining of the uterus, by the process of menstruation, returns to its normal state, and then again, after an interval of two weeks or more, it begins again gradually to swell, and gradually becomes the very thickened lining in preparation for the next awaited impregnated ovum. And so the process continues during the menstrual life of every woman, unless some changes occur in the ovaries, or in some other glands of the body, which make menstruation either continuously diminish, or which bring it to cessation entirely. (Operations, such as removal of the ovaries, or of the uterus, stop menstruation.)

Menstruation is a process which, while it evidences itself mostly in the regular monthly flow of blood from the uterus, nevertheless acts upon the entire body. In other words, the preparation for the imbedding of the ovum is accompanied by general or constitutional symptoms. The secretion of the ovary, being responsible for this congestion in the uterus, also produces certain congestions in the various mucous membranes of the body, so that the lining

of the nose, the larynx, the lining of the stomach and other mucous membranes take part in this ante-menstrual congestion or hyperæmia. In the few days preceding menstruation, this action of the ovarian secretion evidences itself in many patients by an extreme degree of irritability or restlessness. This is undoubtedly due either to the hyperæmia or congestion produced in various parts of the body by the secretion of the ovaries, or to the irritating or stimulating effect of this ovarian secretion on other glands.

Many individuals go through the pre-menstrual and menstrual period all their lives without any annoyances, others suffer much in the few days before menstruation, and many suffer a great deal during menstruation itself. The annoyances which occur before menstruation are known as the pre-menstrual phenomena.

Some patients notice only a fullness of the breasts; others have a sensation of fullness down in the pelvis; others suffer from backache; others are extremely irritable and cross and restless; others are sleepless. Occasionally patients suffer quite in the opposite direction, which means they are very languid and sleepy and have no ambition or "go," in the few days preceding menstruation.

All variations and degrees occur during this period, depending upon the manner in which the nervous system of each patient reacts to the stimulation of the ovarian secretion, which acts not only on the uterine lining but on the body in general.

Dysmenorrhea.—During menstruation these general annoyances may persist or be intensified. Then comes a large class of annoyances caused by pain and known by the term dysmenorrhea, which means painful menstruation. The pain may come on before menstruation, it may come on during, it may come on after, or it may persist during

the entire time, or it may last only a few hours. It may be spasmodic occurring only at intervals, or it may persist at more or less irregular intervals during the entire time that menstruation continues.

The causes for dysmenorrhea or painful menstruation are very numerous, depending either on conditions existing in the uterus itself or on the nervous reaction or sensibility of the patient. This much may be said. The processes and steps which occur during menstruation are practically the same as those which occur during labor, that is, blood is poured out from the uterine lining, an unimpregnated ovum is expelled, the uterus contracts, at more or less regular intervals, the neck of the womb dilates, and blood is forced out through the cervix and vagina.

All the various steps of labor are hereby followed. Therefore menstruation may be considered as a miniature labor, whereas labor may be called a magnified menstruation.

During the entire life of every woman, the uterus undergoes rhythmical and regular contractions which are not felt by the patient. These contractions constitute the exercise which the uterus is giving to itself. It is a form of *automassage*, and keeps the uterine muscle in good condition. When the patient menstruates these contractions are intensified because blood is poured out into the uterine cavity and the uterus is stimulated to contractions to expel the blood.

If for any reason the neck of the womb does not stretch widely enough to allow the fluid blood to pass out, or if there is a curve in the neck of the womb which renders the expression of blood difficult, or if the blood in the womb clots and therefore must be expelled through the cervix in larger form than when fluid, pain is bound to be experienced.

There are other instances where none of these conditions exist and still menstruation is a very, very severe annoyance. It may be said that just as great as are the varying emotions and degrees of pain which are experienced by patients during labor, so great and varying is the degree of pain experienced by patients during menstruation. The most fortunate patients are those who experience no annoyance before the onflow of blood, either of a constitutional or a local nature, and those who experience no pain or discomfort during menstruation itself.

It must be understood, then, that menstruation is a process which acts and reacts on the entire organism of the patient, and if the individual has any point of least resistance, that point is likely to be brought out clearly during the pre-menstrual and menstrual period. As patients grow older and bear children, various anomalies are liable to occur. The uterus or womb is liable to descend more than is the normal position. The fundus or body of it may be tipped backward in varying degrees. The ligaments in the pelvis may not return to their normal elasticity. The ovaries may prolapse and yet all these conditions may give very little evidence in the way of pain.

As we may have a failure of the local pelvic organs after one or more labors to return to their former position and elasticity and state, so other conditions in the body may be associated with this failure. In other words, there may be a failure of the abdominal wall to return to its normal position and elasticity. There may be a failure of the intra-abdominal organs, such as the stomach, the intestines, and the kidneys to return to their normal position. All these phenomena may be part and parcel of a general systemic lack of tone, a condition of general or constitutional inelasticity. In such patients, even if menstruation, be-

fore this condition developed, produced no annoyances, menstruation may be now a more severe strain. The patient may react more to it, it may annoy her more, it may tax her energy more, she may in addition be losing more blood than is readily spared. In other words, a woman is like a harp, the various strings are played on either tunefully or otherwise by the pre-menstrual and menstrual phenomena.

It is this fact, that menstruation reacts on the woman's nature, and on her constitution, and on her nerve reserve, that helps to make women "the weaker sex."

Associated with this is, of course, the loss of blood twelve or more times each year, continued over a period of years. When to this is added the annoyances which may develop before a baby is born, the strain of child-birth itself, the tax of nursing, the post-partum convalescence, etc., we may readily realize to what a degree menstruation is a handicap in the economy of the average mother. The main thought to be borne in mind concerning any patient, whether she suffers much, or not at all, from pre-menstrual or menstrual phenomena before pregnancy develops is, that after pregnancy has taken place, and labor has occurred, such a patient should be restored as nearly as possible to a normal condition of health.

Labor cures a large proportion of the cases of dysmenorrhea. By labor the cervix is stretched, the elasticity of the muscle fibers is diminished, the canal is greatly enlarged and in many cases, small or large tears in the cervix increase the patency of the cervical canal.

FECUNDATION

Spermatozoa and Ova.—When the spermatic fluid is examined under the microscope, if normal, it is found to contain myriads of movable bodies. These consist of a very narrow, long tail and a relatively large, oval-shaped head. These bodies have the power of propulsion, and under the microscope they are seen to be swimming around in all directions with the greatest degree of activity. They are, relatively speaking, very much allied to the little cilia which line the tubes and the uterus, and which exert a wave-like current from the outer end of the tube toward the uterus, and from the upper part of the uterus toward the lower part or the neck, and to which reference has already been made (pp. 15, 16).

These spermatozoa are live cells given off in a fluid secretion from the genital organ of the male. When deposited in the vagina, especially in the posterior cul-de-sac, they lie in the little reservoir into which the neck of the cervix dips, as described on p. 18. By their own propulsive power they move up through the cervix, with its contained plug of mucus, and through the uterus, ready to meet an ovum which may have been thrown out from the ovary (Fig. 6).

These little bodies are very sensitive. Acrid secretion, or secretions of a highly acid nature, serve to impede their activity. Drugs of various sorts, when used as douches, serve to destroy them entirely.

The vagina has a slightly acid reaction, which is not strong

enough to injure these spermatozoa. On the contrary, it serves to keep them in good and normal condition. If this posterior reservoir, into which they are supposed to settle when deposited there, is exceedingly shallow, or if the patient assume an erect position, the spermatic fluid may be poured out of the vagina and very little may come into contact with the cervix. If these spermatozoa are not active, it takes very little to destroy their activity or to render their ascent difficult. If they are extremely active and virile, it takes a great deal to destroy their activity.

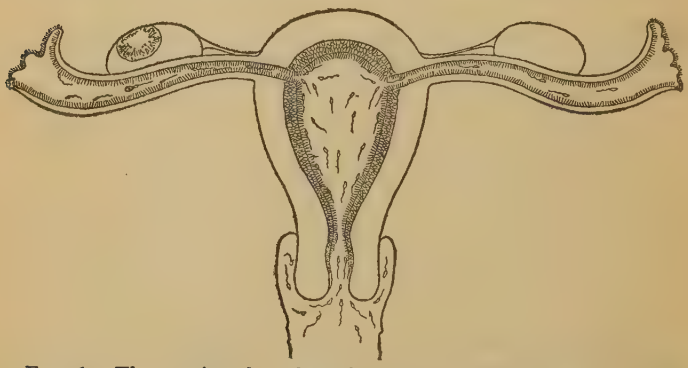

FIG. 6.—The ovaries, the tubes, the uterus and the vagina; showing the spermatozoa moving up through each Fallopian tube to its outer end, and even into the peritoneal or abdominal cavity.

Even if the spermatic fluid is deposited only in the outer region of the vulva, in many instances they have the power to pass up through the vagina, and then enter the cervix and upward to meet the ovum.

The head of a spermatozoön is what may be called a nucleus; of itself it has no power. The ovum, when it is thrown out from the ovary, has within it a nucleus. This nucleus of itself has no power. If let alone, each of these two bodies, the spermatozoön on the one hand and the

ovum on the other hand, die. The ovum is thrown out of the uterus by the action of the cilia or by the action of menstruation.

On the other hand, the spermatozoa are capable of living many days. Eight to twelve or fourteen days after they are deposited in the posterior fornix they may be found alive in the uterus or in the tubes or out in the abdominal cavity, awaiting the approach of an ovum.

When a spermatozoön approaches an ovum some attraction exists which draws it to the ovum. The spermatozoön then perforates the ovum and enters it, the tail is lost, and the head, which constitutes the nucleus, joins and unites with the nucleus of the ovum. When these two nuclei unite, **impregnation or fecundation has taken place,** and the ovum is now a living entity, capable of division and subdivision and growth.

The impregnated ovum grows then by dividing into two cells, then into four, then into eight, and so on into the tremendously innumerable cells which constitute the shell and the young, little embryo, and into the countless, well-differentiated cells which constitute the various organs of the well-developed fœtus.

When the ovum is fecundated, it secretes or forms a certain ferment which is produced by the cells on its outer surface. This ferment has the power to liquefy or digest the cells of the decidua (lining of the pregnant uterus). Hence, when this fecundated ovum enters the uterine lining, it settles preferably and usually on a smooth, normal area. The ferment then dissolves the decidua immediately underneath it, the egg settles down into the decidua, into a little hole, and is then imbedded (Fig. 7). From that time on, we are concerned with the growth of the ovum, which means the growth of the outer cells, and the growth of the

sac within, which is filled with fluid, and in which the little embryo develops.

IMPREGNATION

If the spermatozoa in the seminal fluid, which is usually deposited in the posterior fornix, are alive and active:

If no secretion or discharge present in the vagina, cervix or uterus destroys the activity of the spermatozoa:

If no obstruction to their upward movement occurs, either because of the character of the mucous plug of the cervix or of the character of the lining of the cervix:

Then the spermatozoa enter the uterine fundus, and pass up over the endometrium or lining, against the current produced by the uterine cilia, and enter the tube. It seems as if the action of the cilia, waving *toward* the cervix, may actually be the stimulus which influences the spermatozoa to move *against* this current.

The uterine cavity may be so altered by the character of its secretion, or by the presence of overgrowths in its lining, or it may be so distorted by the presence of uterine tumors, or in fact, the character of the lining itself may be so different from the normal, that the upward course of the spermatozoa is interfered with, or possibly totally prevented. But these same conditions which may, by chance, not obstruct or prevent the upward movement of the spermatozoa may, and do, with far greater frequency, prevent the ovum, when impregnated, from finding the proper bed in which to nest itself.

When the spermatozoa have passed over the mucous membrane lining of the uterus, they pass out through the tubes toward the abdominal end, here again propelling themselves against the current created by the action of the tubal cilia. They may even pass, and often

do pass, out into the abdominal cavity. The spermatozoa and the ovum may meet at any point. It is known that a frequent point of contact is in the outer end of the tube. It may occur in the peritoneal cavity, or even in the ovary itself. Usually fecundation occurs in the tube, but may readily occur in the uterus.

If a spermatozoön enters the ovum, the head penetrates into the structure of the ovum, the tail probably disappears. When the spermatozoon and the nucleus or main element of the ovum unite, the now impregnated ovum is usually carried along the tube into the uterus, though it may in some instances remain in the tube and never reach the uterus. (This is discussed under ectopic gestation (p. 171).)

When the impregnated ovum enters the uterine cavity, it finds the lining very much thickened, much overgrown, and very well supplied with blood, so that a moss-like bed is formed in preparation for the nesting.

It must be remembered that a Graafian follicle may burst at any period, but that one usually breaks a few days before each expected menstruation, either from one ovary or the other. Occasionally one ovum may come from a follicle of each, and very rarely two or more ova from one follicle. This explains twins, triplets, etc.

About ten days before each expected menstruation the uterine lining grows thicker, as previously explained, the cells become several times their normal size, the blood-vessels become filled and engorged with blood in preparation for an impregnated ovum. If the fecundated ovum settles within the uterus, no menstruation takes place. If no fecundated ovum comes there, then this thickened, overgrown endometrium is relieved of its plethora by loss of blood from the vessels within it. This process is known

as menstruation. The lining of the uterus is not thrown off, only blood and some cells are lost.

It may happen, and probably often does happen, that the character of the uterine lining, as a result of changes produced by overgrowths (or by inflammation, tumors, polyps or uterine adenoids) is of such a form that, when this pre-menstrual preparation of the uterine lining takes place, the character of the tissues is not favorable to the proper nesting of the ovum, so that either the ovum does not settle in the womb at all, or if it does, it is expelled within a few days or a few weeks afterward. It is quite possible and probable that many patients who go occasionally or often from five, eight to ten days over the period and then menstruate, represent cases of extremely early abortion, if that term may be used without certainty as to the existence of a pregnancy.

NESTING OF THE FECUNDATED OVUM

When a fecundated ovum nests in the uterus, the process is called imbedding of the ovum, because the egg actually sinks into the overgrown uterine lining or decidua (Fig. 7). This lining is now called decidua, as previously explained. Under the impulse of the fecundated ovum, the decidua, as it is not relieved of blood by menstruation, continues to grow thicker under the stimulating influence of the substance given out by the corpus luteum and by the growing egg.

This ovum has on its outer surface a constantly growing mass of cells which penetrate and digest the mother cells, that is the cells of the decidua. The egg, as we have said, seems to bore a hole and sink into it, and is then covered by a tiny sort of scar.

From this time on, the tiny ovum grows most rapidly,

developing an outer covering composed of two layers of very thin tissue which constitute the so-called *shell* of the egg, soft in character. Within this shell there accumulates fluid, called the liquor amnii, and in this fluid grows the tiny embryo, connected with a certain portion of the shell by a tiny navel cord or umbilical cord (Fig. 8). The part of the shell to which this little cord is attached is that part which rests on the mother's uterine lining, in other words, the

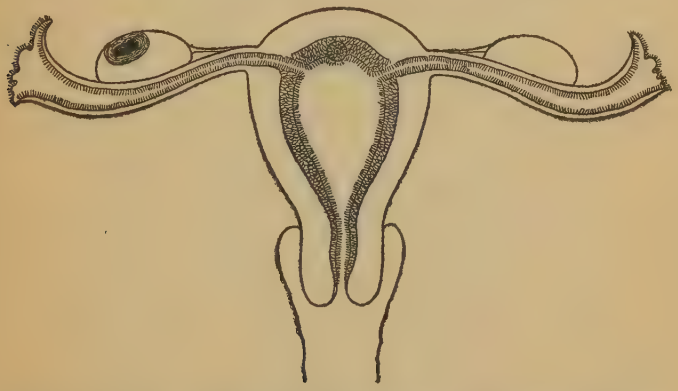

FIG. 7.—An ovum has been fecundated. The Graafian follicle does not heal into a scar but remains in the ovary as a yellow body. The fecundated ovum has moved through the tubes into the uterus and has settled at the upper part of the uterus by imbedding itself into the lining of the uterus which is now known as the decidua. Impregnation has taken place.

point at which the egg first settles. This point, where the egg first settles, this point, where the cord is attached, is thus the situation of the future *placenta* (mother cake). The entire outer covering of the egg-shell is composed of growths of cells which may be described as finger-like prolongations called chorionic villi, and the outer covering of the shell is called the chorion. Immediately underneath, and later closely attached to it, is a very thin layer called the amnion, the two forming the egg-shell or membranes.

The chorionic villi, at the point where they are attached to the uterine lining, grow tremendously in size and extent because they have grown into the decidua cells, have opened the tiniest of the blood-vessels, and are being bathed by the maternal blood. The chorionic villi on the remaining periphery of the egg-shell are gradually stretched as the egg-shell grows larger. They are covered only by

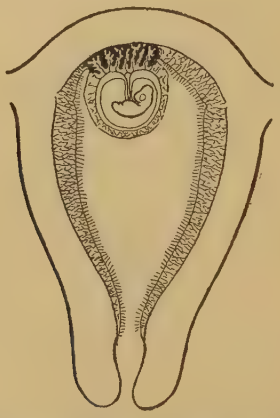

FIG. 8.—The ovum has developed at the point where it first settled and embedded itself. It consists of a sac filled with fluid in which lies the tiny embryo. The point of attachment of the ovum to the decidua shows projections or villi, which establish the connection which furnishes the nourishment to the ovum from the maternal blood which bathes these villi. This is the location of the placenta or after-birth, the beginning of which is now evident. The ovum hangs in the uterus by a broad but frail attachment.

the finest layer of decidua, being nourished poorly by blood. The egg increases in size through the increase of fluid within it and the growth of the embryo so that we have within the uterus a sac filled with fluid, attached to the wall of the uterus by a delicate, broad base, which base is the future placenta (Fig. 9).

The ovum in the early weeks by no means fills out the

cavity of the uterus; it hangs there like a very much enlarged grape, with a broad stem. As the ovum grows larger the womb grows larger until, at the end of the third

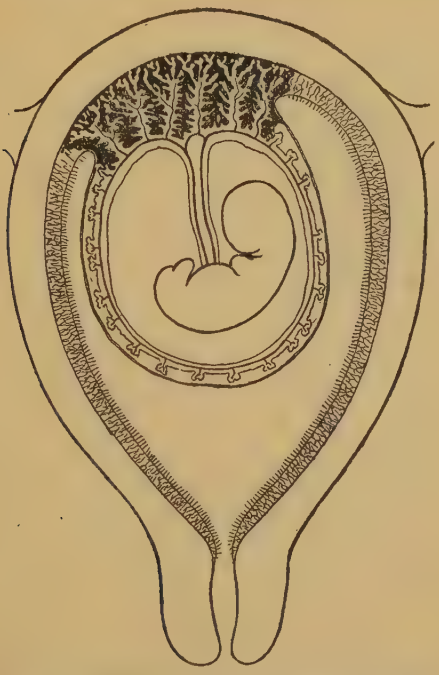

FIG. 9.—The ovum is growing by a constant increase of fluid in the sac and by the growth of the embryo. The attachment of the embryo to the placenta by a cord is seen. The placenta is growing in size and extent. It is bathed by maternal blood. The covering of the ovum consists of two layers, the outer known as the chorion; the inner known as the amnion. No blood flows directly from the mother into the embryo or *vice versa*. The ovum hangs in the uterus by a broad base or pedicle.

month, the egg has almost filled out the entire cavity of the uterus, and the free surface of the ovum begins to come into contact with the opposing sides of the uterine lining and gradually grows into contact with it, so that finally

the whole surface of the egg becomes agglutinated to the entire inner surface of the womb (Fig. 10).

Before this has happened it is possible for blood at reg-

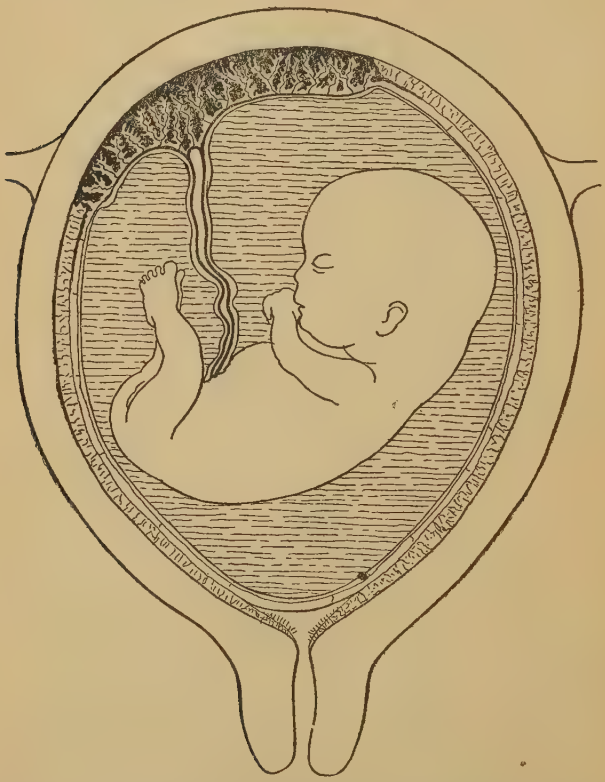

FIG. 10.—The ovum and the embryo have grown so that the entire circumference of the sac is now in contact with, and agglutinated to the lining of the uterus. The placenta is now definitely formed, the cord and its vessels are distinct.

ular or irregular intervals to come from that part of the uterine lining not yet touched by the egg-shell, which explains those cases where menstruation may continue for

one, two or three months after the mother is impregnated. Bleeding before this stage is reached, however, usually comes from that part of the uterine area to which the placenta and the actively growing chorionic villi are attached. During the early months and after the third month, practically all bleedings come from what is known as the placental site. Bleedings from the placental site are either primarily produced there, and may lead to the death and expulsion of the ovum, or else they are secondarily produced by death of the ovum which, as it then forms a foreign body, rouses the uterus to contractions in its attempt to expel the ovum, thus resulting in bleeding from the placental site, secondarily produced.

NOURISHMENT AND GROWTH OF OVUM

HOW THE OVUM IS NOURISHED BY THE MOTHER

When the impregnated ovum settles on the decidua and imbeds itself in it by the dissolving action of its ferments, there is produced around the ovum a lymph-like area which serves to furnish the ovum with its nutrition. The ovum increases in size by a process of cell growth on its outer surface and, by cell increase within it, the embryo grows. The hugely specialized development and growth concerns, of course, the embryo and future fœtus.

The outer surface of the ovum is covered by a great growth of cells called trophoblasts which invade the uterine lining and dissolve the maternal decidua cells. They break into capillaries (the minutest of the blood channels), and this maternal blood comes into contact with the trophoblastic covering of the ovum. Cells of this trophoblastic layer are swept off into the mother's circulation and are dissolved therein. From this time on, maternal blood bathes the outer surface of the ovum. The trophoblast cells have gradually changed into finger-like prolongations, the chorionic villi referred to on p. 32, most marked at that point of the circumference of the ovum where the ovum is in contact with the uterine wall, viz., the area at which the ovum first settled (Fig. 8). This part of the egg-shell grows tremendously and forms, after the first few weeks, quite a dense area called the placenta, which constantly increases in size. The placenta is connected with the umbilicus or navel of the embryo by what is known as the umbilical cord. Not in the early months, but later, vessels develop in this cord which extend from the placenta

through the cord to the embryo. Before such vessels, which carry blood, are developed, the ovum obtains by absorption nutrition from the maternal tissues and the maternal blood which bathes the chorionic villi, by a process probably as takes place in lymphatics.

Later the vessels constitute a complete uninterrupted series of channels from the chorionic villi through the cord. By a continuation of junctions and unions through the structure of the placenta, a blood current is established through the cord in the form of two well-defined veins and one well-defined artery, connected with the vascular system of the embryo. Definite circulation in the embryo is established when its heart begins to beat. Heart beats may be heard by ear after the fourth month. The placenta then acts as a lung for the embryo, which never breathes *in utero*. The blood of the embryo is carried to the placenta into the chorionic capillaries and lymph spaces. These capillaries and lymph spaces are situated in the tips of the chorionic villi. They are separated from the blood of the mother which bathes the placenta, by old trophoblast cells only. So now the chorionic villi are covered by a flat, endothelial-like layer. Between the contents of these intra-chorionic capillaries and lymph vessels, on the one hand, and the blood of the mother on the other hand, the exchange takes place, the embryo giving off to the blood of the mother elements to be excreted, and taking up from the mother's blood oxygen and the various elements essential to its growth. No blood of the mother enters the chorionic capillaries, hence it does not enter the embryo or fœtus. No blood of the embryo or fœtus enters into or mixes with the maternal circulation. The exchange between the blood of the mother and the blood current of the embryo or fœtus is carried on through intervening layers of endothelial

and chorionic cells at all points, in varying proportions at various times. It must be remembered that from the very beginning the outer cell elements of the ovum enter the mother's blood and chorionic cells are continually entering the mother's circulation, being dissolved therein. The further progress of pregnancy means the continued enlargement of the ovum by a constant increase in the fluid and by the constant growth of the embryo into a fœtus and by the growth of the placenta into a flat, cake-like structure of constantly increasing size, so that at full term we have the uterus increased in size almost up to the ribs; a uterus not stretched only, but one which has increased hugely the number of its fibers and cells, so that when the contents are expelled the uterus is larger than three men's fists (Fig. 11).

GROWTH OF THE OVUM AND UTERUS

As the ovum grows the uterus increases in size, to accommodate itself as a nest to the growing egg. Probably the stimulation by the secretion of the corpus luteum aids the uterus in its growth, and there is an increase in the size and number of its muscle fibers. There is a tremendous amount of blood in all the pelvic organs, for the purposes of supplying nourishment to the uterus and the egg. The vagina takes on a distinctly bluish color, the cervix becomes very blue, and its lower end becomes soft. In a few months the entire cervix is soft. At the end of four weeks, the ovum is as large as a pigeon's egg. At the end of the second month, it is as large as a hen's egg. At the end of twelve weeks, it is larger than a goose egg, and the sex of the embryo in such an egg, if thrown out, is distinctly evident.

During these early weeks, there may be pressure on the bladder, and this, together with the associated hyperæmia,

may cause urination to be frequent. When examinations are made, the uterus may feel like a loose sac filled with fluid, if the uterus is in the stage of relaxation, or it may feel firm and hard if in the stage of contraction.

During pregnancy the uterus is alternately contracting and relaxing as it does throughout its whole life, because this action preserves a regular flow of blood, without and within the uterus, and in addition to that, it constitutes an auto-massage which keeps its muscular tone. If an examination be made, in these early weeks, when the uterus is contracted, it often has an irregular outline, depending upon the location of the ovum. If it be in one corner of the uterus, or the other, that part will be more prominent to the examining fingers than the other. This irregularity of outline, in the stage of contraction, plus the larger and softer and distinctly fluid feel in the stage of relaxation, is one of the important signs of pregnancy. At the same time the breasts have become fuller, the veins over them more prominent, pigmentation appears about the nipples, and a dark line appears down the middle of the abdomen.

When pregnant four months, the uterus is readily felt in the lowest area of the abdomen, for it is now rising out of the pelvis. At about four and one-half months, in women pregnant for the first time, and occasionally a little later, the patient "feels life." This sensation is not always recognized at first. The patient feels a sensation like the fluttering of a bird held in the hand. This sensation becomes more and more marked, and is finally recognized as movement of the little embryo within its fluid sac, and later, as little kicks, which become continuously more marked, and which later on are so violent that they are readily recognized, and can be seen with the eye. In subsequent pregnancies, "life" is recognized earlier by women, some-

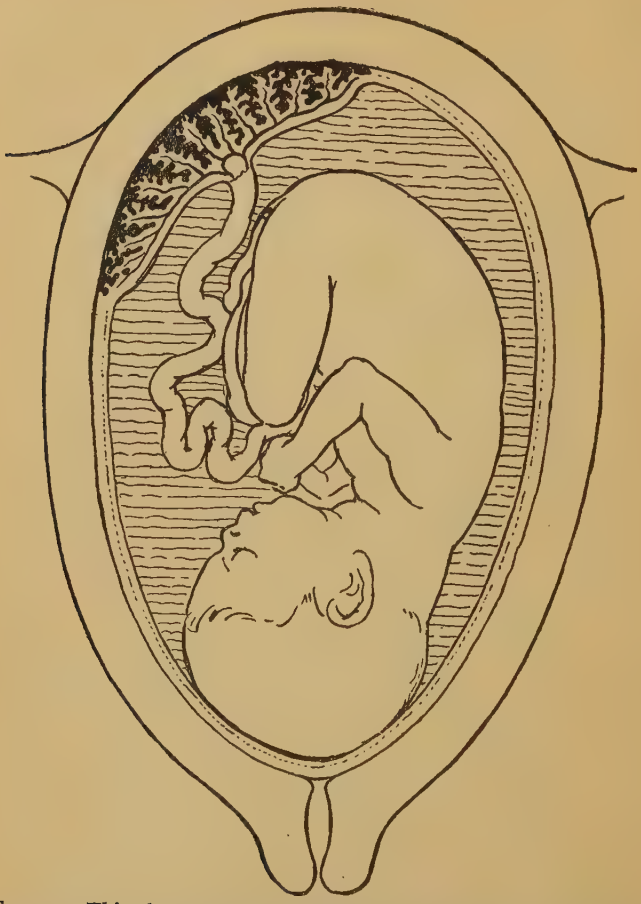

FIG. 11.—This shows the normal position of the fœtus at the end of pregnancy. The arms and legs are folded, the head is down. The long cord is distinctly seen, so is the large placenta. The outer covering of the ovum is known as the membranes and they are closely attached to the lining of the uterus. The fœtus fills out the uterus more than is shown in this drawing. The buttocks and extremities can be felt by the external examining hand.

times when they are four months or even three and one-half months pregnant.

By careful examination with the ear placed over the abdomen the heart sounds of the embryo may be heard as early as the fourth and fifth month, and very distinctly after the sixth month has begun. The rate ranges between 130 and 150 beats a minute. They sound like the muffled ticks of a watch.

When pregnant five months the upper part of the uterus is midway between the symphysis and the umbilicus; at six months it is at the umbilicus; and when seven months pregnant it is four finger-breadths above the umbilicus. A baby born when seven months old may only rarely, with excessive care, survive.

As the abdomen is gradually stretched, numerous pinkish stripes appear over the abdomen. In the early months of pregnancy the navel is depressed. In the latter three months, it becomes more or less prominent. When eight months pregnant the uterus reaches up to the ensiform cartilage. A baby born at this time may certainly live, if proper care be taken. In the last two weeks, the uterus sinks lower, and the upper end recedes from the ensiform cartilage.

At full term we have a uterus in which is the egg-shell, composed of the membranes, closely attached to the inner surface of the uterus at all points except just over the cervix, which it spans. One part of this egg-shell, at the point where the ovum first settled, is hugely increased into about the circumference and thickness of plump pie, thus constituting, as stated before, the placenta or uterine cake. Within this shell is the fluid, in varying amounts. In this fluid is the fœtus ready to be born, lying usually with its head down, and from the navel of the baby to the placenta runs an umbilical cord of the average diameter of the index-finger, and of an average length of 24 inches (Fig. 11).

NAUSEA; TOXEMIA OF PREGNANCY

It is generally known that the early months of pregnancy are associated with nausea and vomiting. Nausea occurs in the majority of first pregnancies, but many women have no sign of it at all. This annoyance is most marked in the morning, especially on arising, hence it may be advisable to take a light breakfast and remain in bed for an hour or two afterward. Some women merely vomit a clear, or greenish, fluid before eating; others lose the entire amount taken at breakfast. Some patients vomit after all meals, but not all lose the entire intake of food.

Food that is chewed ofttimes is retained better than fluids. These annoyances may not occur each day, and vomiting does not persist after the single attack following the taking of food. Most patients are annoyed in the morning, and find no trouble during the rest of the day.

From these milder types there are variations of all degrees, both as to the frequency of nausea or vomiting, and the length of days or weeks during which these upsets occur. In extreme cases, patients must be put to bed for a long time, and be supplied with fluids and nourishment per rectum. There are occasional cases in which the nausea and vomiting are so persistent, in spite of all treatment, in which the patient's condition becomes physically so grave, that the pregnancy must be interrupted. These cases are, fortunately, very few.

As soon as the fecundated egg settles in the uterus, it gives off cells into the mother's circulation, and, as we

have previously explained, this constitutes what is known as the placental ferment which probably consists of various elements. In addition the embryo, later the fœtus, gives into the mother's blood the products of metabolism and the waste products produced during its growth, development and intra-uterine activity. The mother, therefore, takes into her blood placental substances and the products of embryonic and fœtal metabolism.

The burden placed upon the mother's excretory functions, especially the kidney function, by having the products of fœtal metabolism thrown into it, is not very great. The most severe burden is due to the throwing into the mother's circulation of the placental cells and ferments, for these act on various portions of the mother's nervous system, and later on, upon various of the most important of the internal organs. These substances are absorbed from the placental structure into the maternal blood. As the maternal blood reaches every part of the mother's body, it passes through the lungs, the heart, the kidneys, the brain and other essential points. Thus placental elements are excreted by the usual channels in all probability, mainly it may be said, by the kidneys. When these trophoblast elements enter the mother's blood, even in the very earliest days before there is a placenta, when the egg is the tiniest of structures and has the outer covering of trophoblast cells only, ferment-like elements enter the mother's blood. These strange substances, to which the mother pregnant for the first time is very sensitive, produce irritations, especially marked in the central nervous system. The ferments absorbed from the ovum irritate the cerebral areas, producing the phenomena of nausea or of vomiting. The mother's blood reacts to these ferments, *i.e.*, to the presence of these ferments, by pro-

ducing counter ferments, the purpose of which is to nullify harmful influences and actions of the ferments from the ovum, and to render the mother immune to their irritations. Whether some of these irritating substances are excreted into the gastrointestinal tract and in this wise add to the nausea and vomiting cannot be definitely stated.

These ferments from the ovum act with very differing degrees of severity because different individuals react differently to the presence of these foreign cells and secretions. One individual produces rapidly an effectual antiferment or anti-toxin and the nausea and vomiting rapidly disappear. Another produces these substances slowly or in an ineffectual form, and immunity to the nausea and vomiting is not readily obtained. Another person produces these antagonizing and protective substances to so slight a degree that the irritations produced by the ferments or toxins of the ovum act, perhaps, on a hypersensitive organism in so virulent a manner as to poison the patient, producing what may be called a pernicious form of nausea and vomiting, and occasionally producing that very severe condition of the liver known as acute yellow atrophy of the liver. As a general proposition it may be said that the tendency to nausea and vomiting diminishes as the patient approaches the period when "life" is felt. So that, in the usual case in which the nausea and vomiting persist in what might be termed normal limits, the period at which "life" is felt marks the cessation of these annoyances.

Whether at this period circulating alterations in the embryo take place, or whether the character and structure of the now fully developing placenta cause an alteration in the type of the placental ferments, or whether this

marks the period at which immunity is usually acquired, can only be surmised. As a rule, from this period on to full term, nausea and vomiting disappear, except for the occasional recurrence of an attack. In the second half of pregnancy even an occasional period of vomiting must be viewed with suspicion. A thorough examination of the urine must exclude any evidence of irritation of the kidneys, which irritation is produced by substances in the mother's blood coming from the ovum.

FOOD AND DIET IN PREGNANCY

During pregnancy the food and diet of the patient are modified according to the nausea or vomiting from which she suffers, and later on, according to the evidences of liver or kidney disturbance, if shown to exist by the frequent and regular examination of the urine.

If there be little or no nausea, the patient is allowed to eat almost anything which is wholesome and nutritious. The craving for pickles, olives or other foods with a "tang" may occasionally be satisfied by appropriate medication. The things most to be avoided, I have found to be raw fruit (with the possible exception of oranges), and fish foods unless absolutely and unquestionably fresh and perfect. All the stewed fruit desired may be taken.

If patients suffer from nausea and vomiting, even if only in a slight degree, small amounts of food taken at frequent intervals agree much better. No large amount of fluid should be taken at any one time.

With greater and persistent degrees of nausea and vomiting, feeding by the mouth may be diminished very much, and the patient may be given large amounts of fluid by rectum, or may even be fed per rectum. This latter method is used only in severe cases. I have found, if patients of their own accord, or with the assistance of a nurse, are able to take into the rectum and absorb a quart to two quarts of alkaline glucose water every day, that this has a greater effect in overcoming rapidly the nausea and vomiting, than any other one of the remedial measures

of which I have any knowledge. The "Murphy drip" is the ideal method.

The number of drugs given for the nausea and vomiting is legion. Almost everyone has a different combination. This much may be said: any combination which helps is very welcome. On the other hand, it may be said that there is no one combination which helps everybody, by any means.

The patient should lead the sort of a life as before, if it has been a sensible kind. She should eat whatever agrees with her and what she likes, whatever is nutritious. She should go out and enjoy herself, walk, ride, play a little in the open air. She should avoid shocks, falls and anything which may produce a separation of the ovum from the lining of the uterus. Mental relaxation is advisable, so that the theater and other amusements of that sort are perfectly proper.

Constipation.—Plenty of water in small amounts should be taken, so that the kidneys are well supplied. The bowels should be attended to, for constipation is a frequent annoyance in pregnancy. Enemata are of the greatest aid because they give immediate relief and empty the lower bowel, but their too frequent use is sometimes annoying because hemorrhoids result. On the other hand aperient waters form a habit from which it is hard to be freed, and besides, in the early months, are too constant a strain on the gastro-intestinal tract. An occasional dose of aperient water say once every two weeks, but in the later weeks, once a week, is extremely advisable, because intestinal fermentation has some action in increasing the annoyances resulting from the so-called toxæmia of pregnancy.

Pills taken at night are not such very bad things, and quite a variety of pills may be prescribed to be taken one or two every night to stimulate the intestines sufficiently to

produce a daily movement. It may be necessary the following morning to take a little phosphate of soda in water before breakfast, or a little enema some time during the day. But whatever means are used, the intestines must be cleansed every day and no intestinal fermentation should be allowed to continue.

Examinations of urine show when there is fermentation in the intestines, because indican then appears. While indican, of itself, is not a dangerous thing, it is an evidence that there is something going on in the intestinal tract which increases whatever annoyances of a severe nature the patient may have or may, at some later time, develop.

After "life" is felt, the digestive annoyances in the way of nausea or vomiting usually disappear, appetite improves, and the general condition of the patient also improves. In fact, after this period is passed pregnancy in many patients seems to act as a wonderful tonic. Care should be taken not to overeat. We are not greatly concerned with the fear that too great an appetite will have the effect of developing an unusually large-sized child.

Indigestion.—We object to a too great consumption of sweets and sugars, because these are liable to cause indigestion or "heart-burn." It is claimed, however, by some, that continued indulgence in sweets and sugars in large amounts may produce a very large child. The wisest procedure is to allow patients to follow a normal desire with no great increase in sweets and sugars in the earlier and later months, and very little meat in the later months. In the last four weeks no meat except the white meat of chicken ought to be taken, and no meat soups. This is done because of a desire to diminish the burden placed upon the kidneys. With carelessness in diet, and in some instances, in spite of the greatest care, patients may suffer

from indigestion or from heart-burn. If regulation of the diet does not serve to control these annoyances, drugs must be given. Bicarbonate of soda in repeated doses, and milk of magnesia taken for long periods, sometimes for weeks or months, serve to control the heart-burn. In case of sleeplessness, appropriate drugs may be given occasionally without harm. Sleeping with open windows is most advisable. A daily bath, not too hot, helps the circulation, the nervous system and relieves the kidneys of much of their labor. In summer ocean bathing for very short periods may be permitted, but the surf is to be avoided. The usual and ordinary household obligations may be undertaken, but lifting and too frequent climbing of stairs should be interdicted as much as possible. There is absolutely no objection to having the teeth attended to by the dentist, during pregnancy.

Itching.—Not infrequently patients suffer from pruritus or itching of the vulva, with or without leucorrhea. One must first make sure that there is no sugar in the urine, which may be responsible for this annoyance. Douches may be found to be advisable for leucorrhea or pruritus. A glass nozzle with round tip should be used, and the fountain syringe and the water should be sterile. A favorite douche consists of 1 dram of powdered aluminum acetate to 2 quarts of water, to be taken daily. Warm sitz baths increase the comfort of such patients. In more severe cases gauze compresses soaked in the aluminum acetate solution are worn over the vulva.

When, in the later months, evidences of kidney involvement or signs pointing to the toxæmia of pregnancy develop, the diet is altered decidedly. Milk, plenty of water, some of the cereals, and stewed fruits will then constitute the diet.

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ABDOMINAL SUPPORT

After the patient is pregnant four months or four and a half months, about the time when "life" is felt, an abdominal belt is ordered for her. This is preferably made of washable material, the so-called "Storm Binder" being the best, and the one which I usually recommend. At first it gives very little support because the uterus has not yet become large enough, but soon the abdomen becomes noticeably enlarged and then the value of the abdominal belt is experienced.

As pregnancy progresses, the uterus becomes larger and larger. As the stretching of the abdominal wall becomes more and more marked, the belt gives greater support. It holds the uterus in position, keeps it from pressing upon the abdominal wall and stretching it too much, supports the uterus so that there is not too great pressure on the bladder and on the intra-pelvic structures.

In the latter few months it is of the greatest help. The patients are able to walk and perform their usual duties with a minimum degree of discomfort. When the belt is put on, a corset is also worn. The corset should be of the very simplest construction and fit loosely. Its purpose is simply to furnish a protection so that the bands of the skirts do not press too much upon the skin and body of the patient. This corset is made looser and looser as pregnancy goes on, the idea being that it should never be tight enough to press the abdomen, and overcome the lifting or elevating effect of the abdominal belt. This belt is worn up to the very last; occasionally for one reason

or another it may be worn at night if the patient finds that the abdomen is very large, if the uterus is very movable, and if, as she turns from side to side, a great deal of discomfort results. This belt is made of washable material, and for that reason is of extremely great comfort in the summer time.

Abdominal Binder after Labor.—The older method was to always put on a very snug, well-fitting abdominal binder immediately after the third stage was completed. This was supposed to hold the abdomen snugly and to have some effect in pressing the uterus down and preventing relaxation. It has no effect on the subsequent process of uterine involution. With some patients there is a sense of comfort in having a tightly fitting band around the abdomen, especially as they turn from side to side. I, however, rarely apply it, using only a T-binder which serves to keep the vulvar pads in place. Without a binder patients are allowed to move about, lie on their right and left side, and the abdominal wall returns to the normal without the aid of any abdominal binder. There is no objection to its use; on the other hand, there is no advantage in its use, and I have discarded it long since.

BREASTS AND CARE OF BREASTS BEFORE LABOR

Very shortly after pregnancy takes place, the breasts begin to show manifest changes. They become somewhat more tense, they become increased in size, the patient is aware of a certain sense of fullness or sensitiveness, large blue veins over the breast begin to increase in size and number, the nipples and the surrounding tissue begin to take on a darker color.

After a few weeks, pressure of the right sort enables us to squeeze a clear, colorless fluid out of the breasts. This is known as *colostrum*. It is not milk. The presence of colostrum usually accompanies pregnancy. It is one of the associated signs of pregnancy, but need not always be present, nor is its presence an evidence that pregnancy has taken place. It happens that with certain pelvic irritations, and with the presence of fibroids in the uterus, not so very rarely the breasts show a secretion, not always of colostrum, sometimes of milk.

If a miscarriage takes place, or if the fœtus dies, this secretion of colostrum not infrequently changes to a white milk, hence in some instances the presence of milk in the early or middle months of pregnancy is a point to be duly considered.

As pregnancy goes on, the discoloration of the nipples and the surrounding tissue becomes more marked. Much of this discoloration and pigmentation is permanent, so that a woman who has had one or more children shows a lasting alteration.

No attention need be paid to the breasts or nipples in

the early months. However, in the last four weeks it is the rule to pay some attention to the nipples, in order to prepare them a little for their subsequent function. Many nipples are rather small, not raised much above the surface; others are very prominent; others are extremely tender and sensitive. It is a good idea, every night before retiring, to massage the nipples a little so that they will stand out, and then to apply a lotion to them consisting of some antiseptic hardening solution. A favorite application consists of boric acid, 1 teaspoonful to 3 ounces of 70 per cent. alcohol which is applied with the aid of cotton to the nipples every night after preliminary massage of a minute or two. Glycerole of tannin may be used in the same way. After pregnancy has been terminated, the breasts begin to take on their new function. They produce milk.

SUPERSTITIONS OF PREGNANCY

There are many superstitions concerning pregnant women. Many women have heard it said that events which make an impression on them during the child-carrying stage affect the child, such as the sight of disagreeable objects, the sight of a fire, the sight of a mouse. It is felt that these things affect the child either as to its nervous state or by leaving on various parts of the body imprints like the object seen, hence birthmarks and dark red discolorations are considered to be the result of such influences. It is also said that disagreeable things that the woman experiences, things that make her unhappy, or worried, act injuriously upon the child.

Of course, it must be stated that to whatever degree a mother's health be injured while bearing a child, to that degree the nourishment of that child may be impaired. But it must not be forgotten that, after all, the fœtus which the mother is carrying in the womb is a little being encased in an egg-shell and floating in fluid. There is no direct channel, of a nerve nature or any other nature, between the mother and this little ovum with its contents. The only connection is through the medium of the blood, and the entire purpose of this blood is to come into contact with a certain part of the egg-shell and thus feed and nourish this ovum, and then when the ovum has within it a little embryo large enough, the blood of the mother exchanges its product with the blood of the fœtus, not directly blood to blood, but substances pass from one to the other through intervening cell layers. The egg, including the little fœtus,

is the product of the union of one cell of the male and the egg of the mother. Whatever that egg of the mother was at the time it was joined by the cell of the father; whatever that cell of the father was when it joined the ovum of the mother, these create the new being. It is the result of the various elements and potentials existing in these two cells. Hence it may be said that at the moment of their union, at the moment when the ovum is fecundated, at that moment the destiny of that particular embryo is settled.

Why various children of the same parents, even twins, differ so much is a matter which we cannot decide. It is true that the reaction of one cell on the other produces in successive children of the same parents different combinations in the way of appearance, nature, etc., but those combinations, after all, can be recognized, in the course of time, to be the result of the forces, powers and potentials existing in either one or both parents or their progenitors.

This holds true of color, this holds true of height, this holds true of size, this holds true of peculiar deformities or peculiar marking, peculiar characteristics, facial or otherwise, which exist and characterize certain families. This holds true in different races; the evidences are too numerous to be mentioned. This is an absolute fact.

Any ideas which we have heard or read or learned which suppose that the sex of the child may be regulated by any procedure as to the union of the male and female elements have proven so far to be without foundation. Why sex follows one course or another in different families—the male predominating in some, the female in others, or the divisions being equal in others—we do not definitely know.

Many other ideas are erroneous, such as that the position in which a woman sits has an influence upon the position of the child. I have heard it frequently said that women

should not cross their legs. The only reason that I can imagine for this is that in the later stages it may be possible that this position might, by pressure against the abdomen, influence to a slight degree (although I cannot believe to be very important) the position of the head, which is usually found below.

Other ideas are to the effect that one should not stand on a stepladder and lift; that one should not reach upward or hang pictures because that is supposed to injure the position of the child. Whenever a child is born with a twisted cord, or found to be dead within the uterus because the cord has been twisted in a knot, one may always find that the patient has done something which, if the imagination so wills, may be held responsible for this accident. As a matter of fact, such accidents as the cord being around the neck of the child, or knots in the cord, are due to the fact that the embryo within the uterus, especially if plenty of water be there, is constantly moving about, changing its position, particularly in the early months, and the wonder is, not that this occurs so often, but that it does not occur more often.

Another notion is that the appetite for food which the patient exhibits during the child-bearing stage has a marked influence on the child. My observation shows me that many patients who eat very well have small children and many patients who eat very little, either because they are small eaters or because they have not been well during the early months of pregnancy, have very large children. I believe the size of the children depends almost entirely on the matter of inheritance, and I do not believe that starving the mother or diminishing her food supply very greatly will always bring about the development and birth of a small child.

A fact which I desire to reiterate is that the fœtus, and this includes the egg shell in which it grows, is the product of the union of two cells. Each of these cells represents within itself potential forces. That means inheritance, too, through the individual father and through the individual mother, and as the degree to which these forces react on each other in the union of these two cells is a matter which no one can foretell, it constitutes a question under the heading of heredity.

This matter has a rather important bearing, because it frequently happens that young women, in their first pregnancy, overhear many opinions which are foolishly expressed. They hear the "fixed ideas" of people who have heard things, or who have "experienced" these wonderful phenomena in their own cases, and a great deal of worry is caused these young patients. They imagine or fear that something terrible may happen to their progeny owing to various errors they are supposed to have committed, either in little things they have done, or in errors of diet, or in any accident which has occurred, or in the frightful things which they may have seen or heard.

During the child-bearing stage, a woman's mind should be as free as possible of worry about senseless and foolish things. It should be fixed in happy lines, simply for the general effect that it has on the patient's system and the patient's welfare.

Wholesome food, plenty of exercise, good sleep, and freedom from mental worry are important factors in sustaining the nourishment of a patient, enabling her to approach the period of lying-in with a great deal of confidence and freedom from imaginary dangers. These things are all-important, as said before, from a general standpoint, as regards the patient's condition, as regards her nervousness,

as regards the courage with which she approaches the period of labor. Hearing of the accidents which have happened to other people during their child-bearing stage or during their labor, hearing of the various accidents which have occurred to babies, all have a bad effect on the nervous state of the individual. It is the same as with a surgical case. The more free from worry a patient approaches the operating table, the better her system sustains the shock of the operation, even if simple, and certainly the better she sustains the shock of operation, if the procedure be a severe one. The same thing holds true with a lying-in patient. It makes it easier for the patient, it makes it easier for the nurse, and it makes it infinitely easier for the physician. The best form of "twilight sleep" of which I have any knowledge is the total freedom from worry about senseless and imaginary conditions.

VALUE OF REGULAR EXAMINATIONS OF THE PATIENT

Patients should be examined every two weeks as soon as the existence of pregnancy is definitely settled. In the first place, in the very early weeks one must make sure that the pregnancy is within the uterus and is not outside of the uterus in the tube, a condition known as extra-uterine gestation or "outside pregnancy" or false conception.

After the existence of an intra-uterine pregnancy is definitely settled, the patient should be examined every two weeks for the first three and a half or four months, in order to be sure that the position of the uterus is correct. It is not generally known that in 25 per cent. of the cases the womb lies or tips backward, a position known as retro-version or retroflexion.

In another proportion of cases the womb, as soon as it becomes heavy with the egg within, seems to show a tendency to fall backward. If the pregnant womb becomes retroflexed sufficiently, then, instead of growing up out of the pelvis, which it does at the end of the fourth month, it may continue to grow down into the hollow of the pelvis, so that eventually, if this condition is not recognized, the growing womb will become impacted within the bony pelvis and difficulties of various sorts may result.

If the uterus be examined regularly within the first four months, perhaps this condition can be foretold, and if it shows a tendency to occur it may be corrected, especially by the use of a support. After the first four months

the uterus begins to grow up into the abdominal cavity, its presence even being evident to the eye, the patient grows larger and larger, and the fact that she is pregnant is evident.

During the next three or four months examination should be continued just the same, because it is wise to make sure that the uterus is growing continually larger, and that there is within the uterus a living child. Of course patients usually know that the fœtus is alive because they feel the kicking and the movement. But in many instances the kicking and the movement are very slight; there may be a large amount of liquor amnii and the patients may feel very little. Therefore, it is the duty of the physician, by continued and regular examination, to make sure that the embryo or fœtus is alive. It not infrequently happens that the uterus fails to increase in size because the fœtus has died. This may escape the attention of the patient herself for several weeks or months, and if the physician be not open to knowledge on this point, embarrassing conditions may result.

In the last two months, it is essential to examine externally and internally with regularity. External examination gives us some idea of the size of the uterus and the length of time that the patient has been pregnant. (The absolute need for regular examination of the urine is discussed in another chapter.)

Examination through the vagina shows us the presenting part, and we usually are happy when we find the head presenting below.

Repeated examination during the final weeks is of importance not only to show us that the head is presenting, but to show us the relation of the head to the bony inlet. It must be remembered that the bony inlet is a somewhat

heart-shaped brim through which the head must pass before it enters into the hollow of the pelvis and so through the neck of the womb into the vagina. (Fig. 13.)

In all women pregnant for the first time the head, during the final few weeks, should be firmly fixed or engaged in the brim, so that gentle pressure upward by the examining fingers cannot dislodge it. Any head (in a woman pregnant for the first time) which is not firmly engaged and moulded within the brim, within the few last weeks, arouses a suspicion of a disparity of proportion between the head and the bony brim.

In various cases the extent of moulding is of different degrees. In some the head is thoroughly through the brim; in some cases the head is quite through the brim, halfway into the pelvis within the final few weeks. These are the most auspicious cases because we know that we have only the dilatation of the neck of the womb and the subsequent progress of the fœtus through the vagina and over the perineum to deal with. In other words, the last weeks of pregnancy demand the greatest care in the study of the relation of the head to the bony pelvis, and those cases in which the head has moulded nicely and formed itself into proper oval shape, half through the brim and into the bony pelvis, those, I repeat, are the cases which we view with a great deal of serenity. When examination shows the head to be firmly engaged in the brim, or to be through the brim, we are content even if labor should prove to be slow. Even if we later decide that instruments must be used, we know that they are to be used under the most favorable local conditions.

In a woman pregnant for the first time, in whom up to the time of the first pains the head is not engaged in the brim, or the head is above the brim, is readily displaced and

cannot be forced down into contact with the brim, we are suspicious that trouble is ahead of us. These are the cases where one may have to decide between a long and protracted first stage to permit of moulding of the head, the use of forceps, or turning of the fœtus, or operative procedure for the delivery of the baby through the abdominal cesarean section incision.

The same does not hold true in women who have had one child. In them it is rare, indeed, for the head to be firmly engaged in the brim in the last month of pregnancy or during the early stage of labor. This happens because the abdominal wall has become stretched, the uterus has been stretched by the previous labor, and for that reason there is no uterine elasticity to fix the head in the pelvic brim. Here we judge the prospects by getting the history of the first labor. If the first labor went off with a reasonable degree of ease, if there was no disproportion, if instruments were not used when the head was high up, if the cord did not prolapse, then we may be fairly or reasonably assured that in such cases the head will eventually mould and pass through the brim as soon as efficient labor pains have begun. This moulding of the head and passage of the head through the brim and through the bony pelvis, in women who have already had one or more children, often occurs with very great rapidity, especially if pituitary extract is used.

It may not be emphasized too much that, in women pregnant for the first time, in the latter weeks of pregnancy the head ought to be found firmly and fairly well engaged in or through the brim.

It must be further emphasized that the early part of the first stage of labor is concerned not only with dilatation of the cervix, but with the further engagement or moulding of the head. The bones of the child's head are so ar-

ranged that they may over-lap each other at the lines of union which are called sutures, the purpose of this being to allow of moulding of the head. It is the moulding of the head that accounts for the shape of the head at birth. In addition, the part of the head which first appears and which is the most advanced portion is usually swollen, through an œdema, or sometimes through an extravasation of blood. This is due to the fact that this part of the head is directly over the opening of the neck of the womb, is not compressed as the rest of the head has been compressed by the pelvic bones and by the soft parts. For that reason this part swells through an œdema of serous nature or of blood.

In conclusion it may be stated that at no period of pregnancy is the patient to be allowed to go more than two weeks without examination.

In the early months it shows the position of the uterus, in the middle months it shows us the increased size of the uterus, and we are allowed to recognize the existence of a living fœtus.

In the latter months we hear the child's heart beats. We study the position of the child, and also the relation of the dependent parts usually the head, to the bony pelvis, all of which are points of the greatest, greatest importance.

At each and every visit (every two weeks) the urine is examined. During the last four weeks examinations of the urine are made weekly.

Examinations in the last weeks show us whether there is a normal or abnormal position of the child, and whether the head or breech presents.

Occasionally twin pregnancy can be diagnosed by the size of the abdomen, the finding of numerous fœtal parts and the finding by ear of two different fœtal hearts.

IMPORTANCE OF REGULAR EXAMINATION OF URINE: PRE-ECLAMPTIC SYMPTOMS

When a woman becomes pregnant, an immediate change occurs in the general condition of the patient, as regards the functions of the various organs.

As explained on p. 36, the growing egg within the uterus throws out into the mother's blood, from the very beginning, a certain secretion which comes from the outer covering or shell of the egg. This secretion, in the very early stages, is a new one, and the patient reacts to this secretion and adapts her general systemic condition to it in various ways. In some patients this adaptation occurs nicely, smoothly and evenly, the patient is only slightly nauseated and goes on through the whole term of her pregnancy with little or no annoyance of a digestive or other nature. In other patients, in the early months, there is marked nausea, or else there is vomiting with the nausea, or else the nausea is very persistent, and yields only to the greatest care in the way of treatment, which very often involves very marked care in the diet, prolonged rest in bed, and feeding or nutrition almost entirely by rectum.

I mention these facts because substances which are thrown into the body in the early months of pregnancy begin to manifest themselves mainly by the production of nausea and vomiting with numerous variations in the desire for food. These annoyances, either slight or severe, usually disappear as the period when "life" is felt approaches, so that one may, as a general principle, tell a patient that these annoyances will disappear as soon as "life" is felt.

Then follows a period of several months during which the patient is relatively free of these annoyances.

If, in the early stage of nausea and vomiting, the urine is examined regularly, one will be surprised to often find evidences of albumen, which shows that the kidney is being irritated while excreting from the body these various substances which produce the nausea and the vomiting. Then follows, as said before, a middle stage of several months during which the urine must be examined regularly. In this period, not infrequently, traces of sugar are found, occasionally a great deal of sugar is found. This is mentioned, not because these cases constitute diabetes—this being a rare but important anomaly—but because it indicates that constant care in the examination of the urine shows various stages of what may be called the metabolism of the body, meaning by this the various changes which occur in the body during the pregnant state.

As we go on from the sixth month toward the ninth month, the urine should be examined as heretofore, every two weeks, and in the last four weeks the urine should be examined every week.

It often happens that albumen in varying amounts is found, and that cells from the kidney itself are found, even without the patient's noticing any systemic alteration. On the other hand, in the very late months, the patient may notice puffiness under the eyes, some swelling of the hands, swelling of the feet, especially toward night. This is, in all cases, even when the kidney action is normal, and no albumen or casts are found, an evidence of some gland or systemic change. On the other hand, it is an evidence that care and *constant* care must be taken in watching the patient. It is wise not to examine the urine alone, but to have the patient come every two weeks and

examine the urine at the same time, so that we may get a look at the patient and see what evidences there are of impairment of excretion of the substances which are usually sent out by the kidney. In some instances the kidney secretion may not be very good, from the standpoint of examination, and yet the patient's appearance, her general condition, the character of her pulse, her blood pressure, her freedom from headaches and nausea may show that the case is one that may respond well to treatment. Again, the kidney excretion may show very few, if any changes, and yet the patient's general appearance, the element of œdema or swelling, the presence of headache, dizziness, etc., may show that we are dealing with a patient who must be more than carefully watched.

In the latter months one must warn patients particularly to report when there are nausea, or vomiting, or headache, persistent headache, or dizziness, or a feeling of languor and weariness. The worst cases of kidney involvement occur shortly before labor or during labor or shortly after labor. Changes may occur very suddenly, without very much preliminary warning.

In all cases which do not seem to do well, even if there is very little albumen in the urine, or even if there are few casts, a twenty-four hour accumulation of urine should be collected, and this should be sent to a competent chemist who knows that the case which is being examined is a pregnant one. A very careful and exhaustive test will show whether the various organs of the body are doing their work properly, whether the liver, which is an important organ, is doing its work properly, and whether the patient is excreting the poisonous substances which ought to be excreted, whether she is retaining them within her body,

or whether there is a certainty as to the interpretation of these variations.

There are certain anomalies which are universally expected as indicating grave danger. It is not necessary to explain just what these changes are. They are chemical, exceedingly complicated, and even the best physicians are unable to make these tests themselves, but depend for the interpretation of the examination of this urine on the physician who makes this work a specialty. It is advisable, in the last four weeks of pregnancy, to be particularly careful as regards the intestinal and kidney function. Meats should be almost entirely prohibited, and soups made of meat should be almost entirely avoided. The bowels should be thoroughly opened. Even if they move every day, it is advisable, once a week, to give the patient either Pluto or aperient water or magnesia or some aperient which cleanses the intestines. Intestinal fermentation can be recognized by tests of the urine and, while of itself not an all-important find, it is only one of the symptoms on which the physician should lay stress. In the final four weeks, swelling of the hands, swelling of the feet, especially if they do not disappear after a night's rest, headache, nausea, dizziness, vomiting, any yellow discoloration of the skin, or of the whites of the eyes, should be noted and interpreted properly.

The purpose of all this care and attention is to avoid the possibility of eclamptic convulsions, for these convulsions are only a symptom. They show that the poison has been existing in the blood, and has been circulating through the various organs. This poison affects the brain, it affects the lungs, the liver, the various other organs of the body, and finally in many cases it affects the kidney.

When this poisonous substance affects the kidney, it

produces an irritation there, and this irritation results in the excretion of certain kidney cells, casts and albumen. Then we have a warning to which every physician should pay heed.

While it is true that in many cases the convulsions or the pre-convulsive state comes on suddenly like a thunderbolt out of a clear sky, it is nevertheless true that, in a large number of instances, warning symptoms, either in the urine or in the patient's general condition, or in the patient's appearance are present. When such symptoms are present, it is the duty of the physician to watch the patient carefully, to try and regulate conditions, and remove the symptoms, and, if they still persist, then labor must be induced and the pregnancy must be ended.

It is wiser to take measures before we are compelled to. Then we are sure to save both mother and child.

It is in this connection that the induction of labor or the operation of cesarean section are of the utmost importance.

INVOLVEMENTS OF THE KIDNEYS

A primary pyelitis, evidenced by pus cells, sometimes in huge amounts, may occur in pregnancy, and does so more frequently than is generally recognized. However uncertain the etiology of pyelitis, we know that the bacterium coli is present in 95 per cent. of the cases.

There has been a division into two forms, the ascending and the descending. At present the majority believe in a descending primarily hematogenous path. A primary pyelitis may occur in pregnancy, which is caused or furthered by the pregnancy. If these cases are examined by the cystoscope early enough, the bladder is seen to be normal, and pus is seen coming out of the ureters, which speaks for a primary involvement of the kidneys.

The course, in pregnancy, is characterized by attacks, remissions and relapses. The fever may be of various degrees, may be continuous, intermittent, remittent, with chills, the pulse corresponding to the temperature. The general condition may be disturbed; there is fatigue, headache, nausea. The most important sign is pain in the region of the kidney, especially on the right side. The pain often radiates along the ureters, but the region of the bladder is scarcely ever tender. The pain may radiate into the thighs, into the back, and toward the shoulders. Some cases are so mild that they are overlooked. Examination of the urinary specimen must be made frequently. Many cases of "pregnancy fever" are due to this condition. As accompaniments of the hidden, or latent type, we must

occasionally reckon the nausea and vomiting that sometimes occur in the latter months of pregnancy.

The duration of an attack of pyelitis is, in many cases, about a week. In some instances the fever lasts only a few days, and in severe cases, with numerous chills and high temperature, it may last a month or more.

There are many cases in which the urinary specimen does not change, and the urinary condition continues up to and after labor, and there is always danger of a new attack of fever. The recurrent attacks, whether before labor or after, are rarely as bad as the first one. In many instances the specimen becomes normal, and there is not the least sign of the disease. These cases are not to be considered cured, they simply seem cured. An attack may come on after labor.

Among children, when the bladder and kidneys are affected, 98 per cent. are girls. The most frequent age is from the first to the third year. Therefore, among children, there is a malproportion in favor of girls: the condition lasts often a long time, and is ten times as frequent as in adults.

This "pyelo-nephritis of pregnancy" may be only a relapse of such a latent, symptomless, unrecognized disease which has been lasting for years, or for decades, since childhood.

Acute nephritis may begin during pregnancy. Such cases are extremely rare. They run a severe course, are uremic in character, not definitely corrected by delivery, premature or otherwise, and, on recovery from the acute symptoms, show a tendency to chronicity.

Diseased kidneys, recognized or unrecognized, are decidedly endangered by a gravidity. This influence is decidedly harmful to already involved kidney tissues and

structure; hence pregnancy in a patient with chronic nephritis is a very dangerous condition, leading very early to danger to the patient, not, however, through eclampsia.

A real nephritis produces headache, œdema, affections of sight. We note albumen, epithelial casts, many red blood cells. There may be, then, an acute nephritis, an accentuation of a chronic nephritis, or a recrudescence of a condition dating back to some infectious diseases such as scarlatina.

These are the important conditions to be excluded in the early months. Regular and repeated examinations of the urine are essential, for in the second half of pregnancy many perfectly healthy women show typical alterations in the kidney, which alterations are so frequent as to be looked for as typical changes which, however, may show variations of an excessive nature. These are the result of and one of the evidences of a toxæmia. They do not permanently affect the kidney as the alteration ceases with the emptying of the uterus of its contents at full term. The kidney functionates in its excretory capacity in spite of the presence of albumen, leucocytes, hyaline cylinders, hyaline casts and a few red cells.

This "kidney of pregnancy" evidences really a fatty degeneration of the epithelium and a fatty infiltration of the kidney. It is not the cause of eclampsia.

In pregnancy little attention need be paid to the urea. Indican should be diminished by appropriate medication, but it is albumen that should be looked for, and the urinary sediment should be carefully examined. Tests for sugar should always be made.

The sugar which is often present may be lactosuria. Marked glycosuria, which persists in spite of diet and medication, deserves attention. If, however, we are dealing

with a real diabetic case, the condition of pregnancy constitutes a most distinct danger. That the hypophysis bears some relation to the frequent occurrence of slight sugar reactions is not to be doubted.

TOXEMIA; ECLAMPSIA

The slight albuminuria which is generally present at intervals from the sixth month on, in varying degrees, is of significance, if in spite of diet and treatment it increases steadily. Serious conditions may begin with the same character of changes, so that continued repeated examinations are necessary to find the true meaning of the subsequent course of events. The "kidney of pregnancy" may be irritated by toxic substances in the blood into more severe nephritic alterations.

The important point is the relation of "pregnancy kidney" to eclampsia. In pregnancy we have cytotoxins and cytolysins. The degree to which they equalize each other has a determining influence on subjective and objective symptoms. The placental secretions or ferments circulate in the blood and may cause any of the following degrees of toxæmia:

1. Occasional nausea and vomiting.
2. Persistent nausea.
3. Pernicious vomiting.
4. Acute yellow atrophy.
5. Acute toxæmia with convulsions. (Eclampsia.)
6. Acute toxæmia without convulsions.

The toxic substances which produce these various forms of toxæmia cause varying degrees of kidney alterations, from that of "pregnancy kidney" up to the serious form of kidney involvement.

Just as eclampsia may come on suddenly without warning, so may albumen appear suddenly. It would be a change

much to be wished for if warning of an impending eclamptic seizure were always to be found in the urinary excretion. However, changes in the urine, associated with symptoms, occur often enough. It is our duty to look out for both and to be guided by either.

The kidney in eclampsia is not an inflammatory but a degenerative one, and the changes affect the secreting parenchyma, especially the epithelium of the twisted tubules, which show then cloudy and fatty degeneration, with frequent local necrosis, but these changes are often very slight and cannot be called the cause of eclampsia. Besides, they may be entirely absent, but other organic lesions are present.

In eclampsia we have hemorrhagic and anæmic necroses of the liver, decided parenchymatous degeneration, necroses and hemorrhages in the heart, multiple areas of softening and hemorrhages in the brain, multiple thrombi in various internal organs. Whatever the substance may be which primarily or secondarily causes eclampsia, it is probably the same substance which produces the albuminuria, the nausea and the "kidney of pregnancy," and if approximately 10 per cent. of eclampsias are observed without the presence of albumen, and if, in another proportion the albumen first appears during or after an attack, we may consider the possibility of (1) a slow, gradual accumulation of this toxic substance as an explanation of the one form, and (2) a sudden manifestation of its presence as an explanation of the other form.

We distinguish a liver type and a renal type of toxemia, so far as clinical behavior goes.

Although examination of the urine is an all-important aid, it must be borne in mind that the pre-eclamptic state and eclampsia are not primarily kidney diseases. The

changes in the kidney and in the kidney excretion are in fact manifestations of a toxic substance acting in the blood on all the tissues and organs of the body. Sometimes the liver changes, which are always present, are most marked and the element of acidosis predominates. Attacks of dizziness, persistent headache, affections of vision, diminution of the power of sight, sensations of numbness or twitching in any of the extremities, twitching of any muscle, of the eyelids, must be looked into and taken into consideration in forming a judgment.

A most careful study must be made of the meaning of nausea and vomiting in the latter weeks; the period at which the vomiting occurs; the character of the vomitus; the presence or absence of constipation; the presence or absence of intestinal fermentation; the presence of indican in the urine; all must be appraised at their proper value. Of course, what the patient has eaten for two or three days preceding any attack must always be noted, as certain foods are likely to cause such an upset, and every individual seems to have an idiosyncrasy regarding certain articles of food.

Inasmuch as excretion occurs through the kidneys (but not only through the kidneys) their epithelium suffers. While eclampsia does occur without albumen, and especially so before the attack, yet in the largest number of cases albumen is present, but the general symptoms, other than œdema, are the most important things to consider, for albumen may be slight, and œdema may be absent. We may have albumen without casts, but never casts without albumen. With albumen—and especially if casts be present—there is usually a rise in blood pressure. This may mean retention of substances other than the primary toxic elements.

We are forced to conclude that the close observation of clinical phenomena, the estimation of blood pressure, the examination of urine for albumen and casts, the chemical examination for acidosis and nitrogen partition are of greater importance than any other methods which can be employed.

DATE OF LABOR

Including the stage of delivery, the average duration of pregnancy is considered to be two hundred and eighty days from the first day of the last menstruation. An easy way to reckon this, is to add eight days to the first day of the last menstruation, and then go ahead nine months.

The duration of pregnancy from the date of menstruation is considered to be about two hundred and eighty days, or two hundred and seventy days from the date of impregnation, so that if the date of impregnation were known, one could figure from this. Inasmuch as the date of impregnation is rarely known, one has to figure from the beginning of the last menstrual period.

Now, the ovum which is fecundated is usually the one given off a few days before menstruation. After menstruation is over, the spermatozoa enter the vagina, and pass up through the cervix and uterus and meet the ovum somewhere in the tube or in the uterus, and fecundation takes place, so that the first week after menstruation is a fruitful period for impregnation.

However, if the spermatozoa pass up and unite with the ovum which is thrown off a few days before the next period of expected menstruation, if impregnation takes place then, this fact may serve to prevent the expected menstruation from taking place. Thus the expected menstruation may not take place, or may evidence itself only by a slight staining, or menstruation may last for only

a few hours. Thus it is possible that the date of labor may then be altered, because impregnation occurred just before the expected but omitted menstrual period. It is possible, and it probably often so happens, that impregnation occurs just a few days before menstruation. Menstruation goes on, and yet the patient has conceived. These variations, then, account for the errors of one or two weeks, one way or the other, in our calculations, because we figure the fecundated ovum as being the one which is given out by the last menstruation, and which is usually fecundated a few days after, whereas fecundation may occur a few days before menstruation and not interrupt menstruation or, as is the rule, it may occur before the expected menstruation and inhibit or stop it.

In addition to these slight errors in calculating the expected date of delivery, we must recognize the fact that there are cases, proven by actual facts and by the large size and weight of the baby, which go a month over the expected date. This is indeed extremely rare, and simply shows that the impulse, whatever its origin may be, which brings on labor, was delayed for a period of twenty-eight days. In fact, the wonder is that labor occurs, in the largest number of cases, just about the date at which we figure and expect it. It is a wonderful thing that practically all labors occur two hundred and eighty days after the beginning of the last menstruation, or two hundred and sixty-eight or seventy days after the date of impregnation. What the impulse is which brings on labor regularly at the right time, we do not know. We do know that labor is simply a magnified menstruation, that it occurs ten times twenty-eight days after the last menstrual period. In other words, it occurs on the date on which the patient would have menstruated had no pregnancy taken place.

There must be some alteration between the various secretory glands of the body, on the one hand, and the placenta and its secretion on the other hand, whereby the ovary is brought back to its old power. The ovary produces the stimulation which leads to a magnified menstruation. This action is inhibited during the ten lunar months of pregnancy, and then, on the two hundred and eightieth day, something happens which restores to their power the ovary and the other elements which are influential in producing the normal menstrual function. We know that menstruation stops when a patient is pregnant, because the ovary and its secretion are to a certain extent nullified by the secretion given off from the ovum. Therefore, we may consider this fact, that the secretion from the ovum and the placenta represent a secretion or ferment which nullifies and antagonizes the activity of the ovarian secretion for a certain period only; and further, that the inhibitory, antagonizing action ceases, with a certain degree of mathematical accuracy, and the ovary, fortified by the secretion of the hypophysis gland, comes into its own, and labor results.

Now, the hypophysis, which is a gland in the brain, undoubtedly has very much to do with this, because we know that the hypophysis extract, known as pituitary extract, if used in hypodermic injections, increases the activity of the uterine contractions, and makes them forceful and powerful. This extract, if introduced into the body by hypodermic use, has no effect in bringing on labor pains, but if the patient is in labor, actually so, or only in the preliminary stages, then the injection of this drug brings on rhythmical, forceful pains and shortens the duration of the average labor by one-half. Inasmuch as we know what the extract made from this gland will do, we may take

it for granted that this gland itself is brought into a state of activity just at the two hundred and eightieth day, and if it be not the gland which initiates the process of labor, it at least is the gland which carries the labor through by the production of uterine contractions.

PREPARATION FOR LABOR

The following is a list to be given to the patient. These things are ordered from the druggist and are supposed to be ready in the house, awaiting the period of labor.

1.	Nail brushes, plain	2
2.	Tincture of green soap	4 ounces
3.	Tincture of iodine, 3 per cent	8 ounces
4.	Lysol	8 ounces
5.	Agate wash basins	3
6.	Rubber sheet (6 by 6 feet)	1
7.	Quilted pads (36 by 36)	2
8.	Douche pan	1
9.	Agate pitcher	1
10.	Absorbent cotton	2 pounds
11.	Sterile gauze	25 yards
12.	Agate pail	1
13.	Sterile vaseline	2 tubes
14.	Infant's bath tub	1
15.	Ergotole	1 bottle
16.	Fountain syringe (4-quart size)	1
17.	Dilute acetic acid	8 ounces
18.	Glass douche tips	2
19.	Umbilical tape	2 tubes or envelopes
19*b*.	Iodoform gauze 5 per cent	3 jars
20.	Dermatol powder	1 ounce
21.	Eye dropper	1
22.	Protargol 1 per cent. solution	1 ounce
23.	Small camel's hair brush	1
24.	Tincture Benzoini co	1 ounce
25.	Boracic acid powder	½ pound
26.	Alcohol, 95 per cent	1 pint
27.	Bichloride tablets (colored)	1 bottle

1. Two nail brushes, to be boiled and placed in a 1 per cent. lysol solution for use in washing the hands preparatory to donning sterile gloves.

2. Tincture of green soap is used for washing the hands.

3. Tincture of iodine is used in sterilizing the finger tips. The tips of the fingers should be immersed in a 3 per cent. tincture of iodine, after washing with tincture of green soap and before washing with lysol. It is to be applied to the skin when hypodermics are given; to be applied to the end of the cord after it has been tied and cut; to be used as a douche when needed; to be used for irrigating the vulva if desired. It is especially valuable for irrigating after perineal repair.

4. Lysol is the ideal antiseptic and the only one that need be used. It is used for sterilizing the doctor's hands, for irrigating the vulva, as a douche, as the solution in which the sponges are immersed and in which the boiled scissors, clamps and dressing forceps rest before they are applied to the cord or used in handling the placenta or holding sponges.

5. The basins are to be filled with a 1 per cent. lysol solution. One is used for washing the hands, another holds gauze or cotton sponges for cleansing the vulva and perineum during and after labor, and the third holds scissors, two cord forceps, cord tape and long dressing forceps.

6. The rubber sheet is placed on the bed, over it is a sheet so that both may be easily removed when desired.

7. Quilted pads are put under the patient during labor and changed as often as necessary after labor.

8. The patient is placed upon the douche pan for examination; during the expulsion of the placenta; for any sewing of the perineum; for personal needs.

9. The pitcher is filled with a 1 per cent. lysol solution to be poured into the basins; for irrigating the vulva before each examination; and during and after the expulsion of the placenta; for external irrigation during the post-

partum period, during all of which irrigations the patient is on the douche pan. The external genitalia are not touched by the nurse.

10. The absorbent cotton is to be covered with gauze and used as vulvar pads after they have been sterilized; to make cotton balls to be put in lysol solution for use during labor; to place between the buttocks during labor to keep the Kelly pad dry.

11. Sterile gauze is used as sponges. It is used as a cover for the sterile cotton vulvar pads; to constantly cover the nipples; as a dressing for the cord of the baby; and to wash the tincture of benzoin from the mother's nipples before each nursing.

12. The pail, to throw sponges in during labor, to empty the douche pan in at any time.

13. Sterile vaseline is applied to the face if chloroform be used as an anesthetic. Vaseline is also used to remove the cheesy material which may cover the newly born baby's skin.

14. The bath tub should be ready, filled with hot water, in case measures are necessary for resuscitating the child or for stimulating it.

15. One teaspoonful of ergotole is given after the second stage is over and repeated in smaller doses at regular intervals for several days.

16. Fountain syringe, filled and ready, in case a vaginal or intra-uterine douche is necessary for post-partum hemorrhage; or before or after version or forceps.

17. Dilute acetic acid is put in the fountain syringe with water at a temperature of 115°, as a vaginal or intra-uterine douche for post-partum hemorrhage.

18. Glass douche tips of various lengths with round tips.

19. The umbilical tape is for tying the cord. The cord is

tied twice. The tape is taken out of the tube and kept in lysol until needed.

19*b*. Iodoform gauze is applied to the vulva for two or three days after the labor. A sterile pad is placed over the gauze.

20. Dermatol powder is applied to the cord when the cord dressing is put on.

21. Eye dropper, to drop protargol solution in baby's eyes.

22. Several drops of a 1 per cent. protargol solution should be dropped into each eye of the baby shortly after labor and two or three times a day for the first few days after labor.

23. The camel's hair brush is to be used for painting the nipples with tincture of benzoin. It must be washed and then kept in alcohol all the time when not in use.

24. Tincture of benzoin, applied to the nipples after each nursing.

25. Boracic acid solution removes the benzoin from the nipples before each nursing. It is also for washing the baby's eyes, for any purpose when a cleansing solution is needed.

26. Alcohol, to dilute the iodine tincture whenever needed, for baby sponging, for cleansing, for the nipple brush and for aseptic purposes.

27. The bichloride tablets are used to make a solution which is contained in the bath tub, in which basins, pitchers, douche pan, fountain syringe, etc., are immersed in order to keep them sterile. *Not to be used for the hands nor as a douche.*

The following are the sterilized articles:

Rubber gloves	6 pairs
Leggings	2 pairs
Towels	1½ dozen

Triangles	1 pair
Vaginal sheet	1
Large sheet	1
Gowns (surgeon's)	1
Suit (surgeon's)	1
Applicators (6 in package)	3 packages
Nail brushes	2
Gauze sponges (12 in package)	12 packages
Vulvar pads	2 dozen

Necessary clothing for baby:

Abdominal flannel bands	4
Undershirts	3
Flannel skirts	4
Night gowns	4
White slips	12
Knit bands	3
Diapers	4 dozen

Nursery articles:

Blanket
Assorted safety pins
Soft towels
Wash cloths
Hot-water bag with flannel cover
Castile soap
Talcum powder
Olive oil
Boracic acid
Rubber bath tub
Bath thermometer
Baby scales
Bassinet

FIRST STAGE OF LABOR

When a woman has been pregnant for ten times twenty-eight days, she approaches the period at which the uterus has to expel its contents. When a woman menstruates, the process is that of a miniature labor. The uterus fundus contracts to expel the blood poured out from the mucous membrane which lines the uterus, the cervix dilates to allow the blood to flow out, and an unimpregnated ovum is expelled.

Many patients have no pain when they menstruate, some suffer discomfort, while others have slight or severe cramps, produced, as a rule, by the uterus and felt either in the middle line or on either side. These cramps are really due to contractions of the uterus produced in many instances in the effort of the uterus to force blood out from the neck of the womb. If the neck of the uterus does not dilate sufficiently, or if it is bent on the fundus, producing an acute angle, or if the cervix lining is filled with overgrowths of mucous membrane, all these are factors that produce obstacles to the outflow of the blood, and the uterus must contract with excessive force to overcome the obstruction and pain of varying degrees results.

Now, if the blood which is poured out into the cavity of the uterus, instead of remaining fluid, should form small or larger clots, they then can be forced out through the cervix only by marked dilatation of the cervix and repeated contractions of the fundus. Here again pain may be excessive and cramp-like in character, the cramps not infrequently being accompanied by the expulsion of clots.

In some patients, even when such abnormal conditions and obstacles are present, there is no pain experienced. In other cases, where there is no obstruction and no formation of clots, exquisite pain may be experienced. Hence we are forced to the conclusion that, in certain patients, forcible and painful contractions of the uterus occur either because that is the constitution of the patient, who may belong to the class known to medicine as vagotoniacs, or else we are dealing with a hypersensitive uterus, which hypersensitive uterus may be part of a more or less general hypersensitiveness of the individual, or which may be the only hypersensitive area manifesting itself in the patient's various functions.

Sometimes the pains and discomforts occur two or three days before the appearance of the blood. This not infrequently happens in patients where the uterus is a little smaller than normal. Such a uterus, if the ovaries are normal, becomes filled and engorged with blood, and the uterus, being smaller than normal and its cavity likewise smaller, does not bear well this engorgement, and discomfort and pain are experienced. In other cases the pains come on with the appearance of the blood, which can then be considered as an evidence of the contraction of the uterus and the dilatation of the cervix. Dilatation of the cervix is an extremely painful process, and it can never be done rapidly in a patient who is not pregnant, except under anesthesia, without the greatest pain. In yet other cases the pain comes on a varying number of hours after the onset of the blood, and might then be explained by the accumulation of blood within the uterine cavity and the attempt to expel it in fluid form or as clots.

In some rare cases more than just fluid is thrown out during menstruation. In these exceptional instances small

bits of the uterine lining are thrown off in the form of shreds, or larger areas are cast off, and in certain typical forms the entire lining of the uterus is thrown off as a cast, associated with the most excruciating pain. So that menstruation is, in a large number of instances, a painless procedure, and in very many cases a process associated with some pain and discomfort, and in many cases a regular function accompanied by marked pain.

Labor Pains.—Just as there are innumerable variations in the way of discomforts and pain associated with menstruation, so in labor there are wide variations. They depend upon the character of the contractions of the uterus, the rapidity and ease of dilatation of the cervix; and they depend, perhaps very decidedly, on the sensitiveness of the individual to pain of any sort, but particularly to the pain of the contraction of the uterus. It is not always possible to foretell, from the menstrual history or from the nervous characteristics of the patient, whether the pain which she is to experience will be very severe, or whether it will be experienced so severely as to be accompanied by outcries. "Settling" discomforts often occur a week or two before labor, and there may be pressure on the bladder, etc.

Preliminary Pains.—It often happens that, for periods varying from a few hours to even a few days before well-defined labor pains begin, there are intervals of varying length when occasional indefinite or definite pains are felt. Occasionally the uterus can be seen by the eyes or felt by the hand to contract decidedly, and the patient may be conscious of only a slight discomfort.

In other words, it may take considerable of this sort of "tuning up" before labor actually begins with recognizable characteristics.

In other instances, again, pains may come on every ten or

fifteen minutes for an hour or two and then stop, and they may repeat themselves in this fashion off and on for a period of days. In addition, there may be several forms of pain which may not be dependent upon contractions of the uterus, the so-called "false labor pains." It is quite probable that a great many of the so-called false pains are ineffectual attempts at regular uterine contractions which the organism of the mother is not yet fully prepared to carry on with force.

Patients should notify the physician if they have any unusual pain, if they notice any dribbling of water or any staining of blood or bloody mucus, however slight. Some patients complain so little of pain that they may be well started in labor and mention only a discomfort. In some cases the pains are felt down the front of the thighs and nowhere else. The majority, when labor begins, complain of a pressure in the back or of a backache or of pressure on the bladder or rectum.

When a patient goes into labor, and the preliminary discomforts and pressures and pains have passed, uterine contractions occur with a certain degree of regularity, lasting only a few seconds and occurring at intervals of fifteen minutes or more. The discomforts are usually felt in the back, shooting around to the front, and eventually manifesting themselves in the front as pains of the same character as "unwell" pains. The uterine contractions become progressively more severe, lasting longer and occurring more frequently. A hand laid on the abdomen during a pain feels the uterus grow harder, firmer, smaller, and lift itself up toward the abdominal wall. On observation with the eyes, the uterus is seen to outline itself more distinctly, to become more prominent and smaller, and to lift itself above the convex surface of the abdominal

wall. Such contractions, but of lesser degree, of the uterus are occurring during the entire months of pregnancy, but without any sensation of pain on the part of the patient. And the examining physician, with his hand on the abdomen, can detect these contractions in the months before labor begins, because the uterus becomes a trifle harder, more definitely outlined, and the baby's outlines are more readily felt by the sense of touch. These are the so-called painless contractions of Braxton Hicks, the purpose of which is supposed to be to provide auto-massage for the uterus, which keeps it in good condition, and gives it a mild form of exercise in preparation for its future work.

Dilatation of the Cervix or Neck of the Womb.— As the tiny contractions continue to recur with greater or less regularity, the examining fingers, introduced under the most aseptic precautions into the vagina, may detect a stretching or opening of the cervix during a pain.

In a woman pregnant for the first time, the cervix is felt as a larger nipple-like projection over the circumference of the head which usually, but not always, is the part presenting at the pelvic brim, and as the uterus contracts, it pulls the cervix up around this head, much as a rope or strand passes around a pulley. The final result is that this nipple-like projection becomes stretched and drawn up, becoming gradually finer and more attenuated, until finally only a thin edge is felt closely applied over the presenting head, and into the opening here a single finger may be introduced.

As the uterus contracts, it does not compress the fœtus. It squeezes the water which is within the membranes (or egg-shell), and as the opening at the cervix is the only opening connected with the uterine cavity, the water is pushed down in that direction, and its outlet being obstructed by

the egg-shell or membranes, it pushes a finger-like prolongation of membrane filled with water into the opening of the cervix. As the pain ceases, the uterus relaxes, and this prolongation disappears. At the next pain the uterus contracts again, the waters are compressed, the fibers of the cervix are drawn in pulley-like fashion around the head, the bag of waters is pushed again into the opening of the cervix, until the cessation of the pain again occurs. In this way the cervix is steadily and gradually being thinned out and stretched until the opening in the cervix is about of the diameter of four fingers, or as large in area as the palm of an adult's hand. The more nearly this state of complete dilatation is being approached, the larger in circumference and the more voluminous is the bag of membranes filled with water which is being pushed into the cervix with each contraction of the uterus. When the pains begin, and the cervix begins to be thinned out and then to dilate, there is usually discharged a plug of mucus that was present in the cervix, and this plug is often stained with blood. This is called the "show." During the further stage of dilatation of the cervix there may be no further sign of blood, or there may be an occasional stain, or there may be more in the form of pure blood, these occurring more frequently with a very rapid dilatation of the cervix. Not infrequently a slight stain of blood or "show" is present before the patient has felt a "pain," while she has had only a backache or pressure on the bladder.

Now if, instead of the head of the fœtus being present over the cervix, the buttocks of the fœtus should be there, dilatation may take a longer period because the cervix fibers are not pulled around a large head, and are not drawn up so well mechanically, and the cervix is not being stretched very effectively. Again, if the fœtus lies cross-

wise, so that neither the head nor buttocks are at the cervix, then dilatation of the cervix may proceed in some cases very slowly.

It not so rarely happens that before any pains have begun the waters begin to flow away, sometimes very slowly in the form known as dribbling, sometimes more quickly. The more thoroughly the well-moulded head is present over the cervix, the more firmly it is fixed into the bony inlet of the pelvis, the less rapidly will the waters dribble away.

Labor pains may begin at any time after the waters begin to dribble. They may be delayed for several hours, or even two or three days. Dilatation is then usually a slower process, because the dilating effect of the bag of membranes is not brought into action.

In this case dilatation occurs because the uterus contracts on the fœtus itself, so that the fibers of the cervix are pulled around the head, and because the head is being pushed into the cervical opening.[1]

The duration of the first stage of labor is variable, like the various stages of labor. It takes longer in the woman bearing a child for the first time, and its normal limits are anywhere from six to twelve hours.

Cause of Labor.—We cannot say why labor pains begin at or about the expected period. We do not know why pregnancy continues for ten lunar months and then, in the vast majority of cases, ends at the expected time with a more than average degree of regularity. The probabilities are that the relation between the various internal glands reaches a climax at about this period.

[1] Later we shall speak about the fixation of the head in the pelvic inlet; describe the pelvic inlet and the pelvis; give some idea of how the head rotates; and of the processes of extension and external rotation, for we must speak particularly of moulding.

Some gland or glands either take on a sudden new function or else some gland's secretion, whose action has been inhibited during the period of gestation, reasserts itseld, comes into its own: as if, for instance, the ovaries brought on the menstrual period exactly as the ordinary menstrual period, but in the presence of a developed fwtus.

That the pituitary gland has something to do with the labor pains seems probable, for, as previously referredto, we have an extract of the pituitary gland which can be injected by needle, and which increases the force and activity of the uterine contractions, provided the patient is in labor. If this drug be injected during any of the months of pregnancy it will not bring on labor pains. If the patient is in the first stage of labor, or in the second stage, it enhances these labor pains very much. If, in the so-called "tuning-up" process, the patient is really in the pre-labor stage and suffering from incomplete and unrecognized contractions of the uterus of a different type from the Braxton Hicks type, a hypodermic or repeated hypodermics of pituitary extract will bring on labor pains and will start the patient into labor, evidenced by rhythmical uterine contractions associated with pain, the presence of an increased amount of "show" and blood, and and evidences of dilatation of the cervix.

It happens, for various reasons, that labor has to be induced, or started at some period before full term, or at full term. The best means for accomplishing this purpose is to introduce into the cervix, under full aseptic precautions, an empty rubber bag, folded over into conical shape, and then to inject into this rubber bag a sterile fluid which dilates it to full capacity. These bags are of various sizes and are known as Barnes or de Ribes bags. After one of these bags is in place for a few hours, the cervix becomes

dilated, sometimes with labor pains, sometimes with only a sensation of discomfort, and then a second and larger bag may have to be introduced, until the cervix is sufficiently dilated. If no pains have then come on, the waters are broken, and after varying periods uterine contractions occur and delivery proceeds. If in the process of dilatation of the cervix, in the presence of the first bag or the second, an injection of pituitrin be given or repeated, it may bring on regular, rhythmical uterine contractions, and labor may proceed in the usual normal fashion.

Moulding of the head. During the first stage of labor before the membranes break (that is, while the water is still in the uterus) the uterus is contracting upon the water and the head of the fœtus, especially in a first pregnancy, is being pushed down through the bony inlet. The head becomes more firmly engaged, as we say, and it becomes moulded, adapting itself, by the overlapping of the bones, which are not at all united, to the form of the inlet. The head becomes longer, and the top of the head or the occiput, as we call it, becomes elongated. The uterine contractions do not injure the fœtus, which is protected by the waters; whereas in a dry labor, *i.e.*, if the waters have escaped before pains come on or before the cervix becomes dilated or before it dilates sufficiently, the fœtus is being compressed by the uterus, and the head is being pushed through the cervix and through the bony inlet with more force, and moulding takes place more rapidly and less safely. During the first stage, with the waters intact, the patient may assume any position. The erect position, such as in standing, sitting or kneeling, favors the dilatation of the cervix. There is no need of the patient bearing down in this stage, because this accessory aid has little, if any effect, in hastening

dilatation. When dilatation is once progressing favorably and the patient is suffering considerable pain, it is wise to let her lie down and to stay there until the membranes rupture of their own accord or are ruptured.

The most reassuring feature in the first stage of labor, for a woman who is pregnant for the first time, is to find the

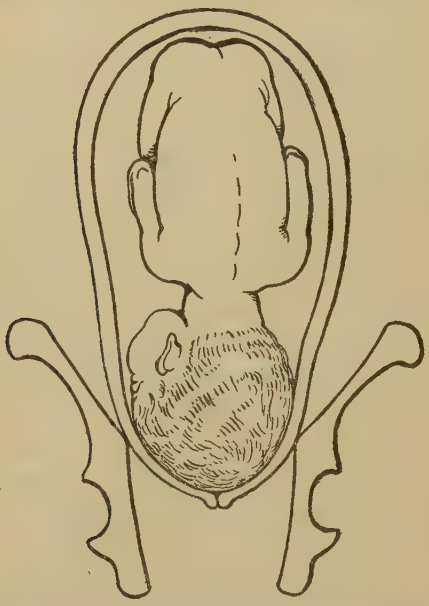

FIG. 12.—Head of the fetus fixed in the brim of the pelvis and moulded in and through the brim—a desirable condition in primigravidæ before labor. Cervix is not dilated at all.

head so firmly engaged that it cannot be pushed up by the examining fingers. This shows that there is no disproportion between the head and the bony inlet. In some cases, even days before labor begins, the head is really through the pelvic, bony inlet, and in some cases it is well down, so that it is halfway through the bony pelvis (Fig. 12).

If a woman, pregnant for the first time, does not in the last few weeks of her pregnancy show the head fairly fixed in the pelvic brim; if a woman, pregnant for the first time, after the development of good labor pains does not show, on examination, the head well engaged in the bony inlet; if in a woman, pregnant for the first time, after the continuation of labor pains of good character for a few hours, there is no moulding of the head through the pelvic brim—then we must pay such a case the most careful consideration, for these variations are abnormal in varying degrees, and show in most cases malproportion between the head and the bony inlet. Any head which is engaged firmly and moulds in the first stage promises well for a birth through the pelvis. Otherwise the head is too large, or else there are some marked contractions or obstructions in the pelvis. Occasionally there is marked diminution in the size of the pelvic outlet. Instruments to extract the child are rarely to be applied unless the head is firmly engaged or moulded. Hence, whatever may be the subsequent cause of delay, whether due to the presence of a large child or to ineffectual contractions of the uterus, such difficulty can be overcome, provided, as stated above, the head is engaged and moulds, after excellent pains have come into being. This rule is almost an absolute one in women bearing their first child.

The first stage is complete when the cervix is fully dilated and the waters have broken or are about to be broken.

TEST OF LABOR (FIRST STAGE)

The deviations from the normal in the bony pelvis are various (Fig. 13). They may be so marked as to absolutely preclude the possibility of birth through the vagina. The diameters may be so diminished as to render birth of a living child, through the vagina, difficult or improbable.

They may be so slightly altered as to render the birth of a living child not improbable but difficult and tedious, or to be accomplished only with the aid of instruments.

These problems concern us most vitally in the first labor, and in the first stage. Here an absolute decision as regards the outcome, with minor variations from the normal, cannot be made beforehand. The "test of labor" is employed in many of the border-line cases.

By "test of labor" is meant observation of the progress of events for a few hours after good labor pains have begun. It will then be found that a head previously not fixed may become fixed, mould itself, and begin to pass through the pelvic brim, even if very slowly. So long as the waters have not broken, this process—even if slow and prolonged—does not of itself endanger the fœtal head nor does it endanger the fœtus, because the uterus in its contractions is prevented by the water in it from too powerfully compressing the baby.

It is a question, settled in varying ways by the different opinions of physicians, as to how long the test of labor should be tried. Many question the advisability of waiting too long, because if moulding does take place, it takes place very slowly and argues, as a rule, for a correspondingly slow progress through the bony pelvis itself, and in many cases implies the use of instruments, all of which, however carefully carried out, mean in many cases exhaustion to the mother and various degrees of risk to the fœtus and varying degrees of injury to the soft parts of the mother. Injury to the soft parts produced by prolonged labor and by the use of instruments may mean tearing of the cervix, stretching of the ligaments and tissues around the bladder, stretching of the ligaments around the uterus, stretching or tearing of the muscles around the vagina and

of the perineum, so that the character of the tissues of the uterus and its surrounding organs is so altered by injury that operations are necessary at a subsequent period to restore the patient to anything approaching the normal condition.

In women who have borne one or more children, in whom the measurements of the bony pelvis are normal, in whom there is no history pointing to a lack of engagement or fixation in the bony brim, successive labors usually progress more readily and much more quickly. Here it is rare, as stated above, to find in them fixation or engagement before labor or even in the early stages of labor. The progress of the first stage may be so slow, the dilatation of the cervix may proceed so lazily, the engagement of the head may be so absent as to suggest in many cases the probability of a malproportion, and yet these very cases, with appropriate assistance (use of pituitary extract) may progress so quickly and be delivered in such a short time as to excite surprise and wonder.

The resistance offered to the progress of the head, as it passes through the pelvis and vagina of a woman who has had a child, is much less than in the first labor. The tissues have been stretched, they have lost their marked elasticity. The muscles of the pelvic floor yield much more readily, and the perineum, even if not torn, stretches very readily.

The Pelvis.—The pelvic inlet has a heart-shaped outline, oval from side to side, the distance from the one side to the other being much greater than from the symphysis in front to the upper margin of the sacrum behind (Fig. 13). Before the head can pass through the bony inlet of the pelvis, it must be shaped to fit its outlines. This is accomplished by overlapping of the bones of the fœtal head, which allows of very great alterations in the shape of the head. Unless the relationship between the size of the child's head and the bony inlet of the pelvis be abnormal, this shaping or moulding of the fœtal head takes place in the latter weeks of a first pregnancy and in the early stages of labor without difficulty. After the head is so moulded that it can be gradually pushed through the brim, it passes through the pelvis itself down to what is called the floor of the pelvis.

It is possible in all cases to gain a fairly accurate idea of the dimensions of the bony pelvis by measurements between certain established bony points on the iliac bones, which external measurements are a fair index of the dimensions within the pelvis. By examination through the vagina, a fairly accurate idea of the distance between the symphysis in front and the promontory or prominent upper border of the sacrum behind can be gained. This is the most important measurement that we can take, because this distance is the most important diameter of the pelvic inlet, and any marked diminution in this diameter means that it will be difficult or impossible for the head to engage or fix itself in the pelvic brim, to mould itself and pass through the pelvic

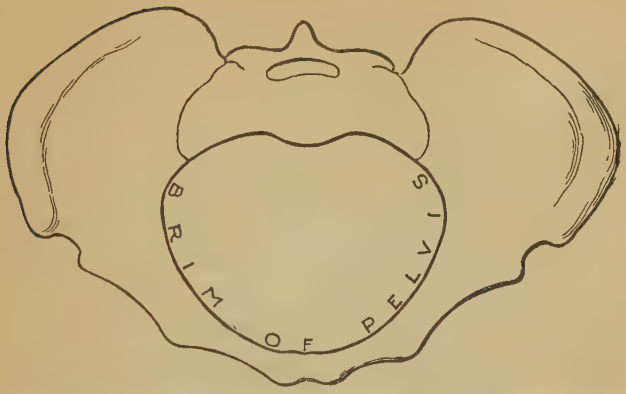

FIG. 13.—Pelvic bones showing the brim of the pelvis, the entrance into the true pelvis. In front is the symphysis. Posteriorly is the sacrum.

FIG. 14.—Head of the fetus fixed in the brim of the pelvis and moulded in and through the brim—a desirable condition in primigravidæ before labor. Cervix is not dilated at all.

brim. Examination through the vagina gives an idea of the distance from the coccyx to the under border of the symphysis, and, by the sense of touch, we determine whether the arch under the symphysis is sufficiently wide, or whether it forms too sharp an angle. If the arch under the symphysis is very narrow, or if the distance between this under border of the symphysis and the coccyx is too short, it means that the bony outlet is smaller than it should be, and that there will be a little difficulty when the head is passing through. The examining finger may also determine the presence of any bony outgrowth in the pelvis and whether any tumors of the uterus or of the ovary are fixed in the pelvis and are obstructing the head in its passage through the pelvis.

As the head passes through the interior of the pelvis itself it compresses the various organs and structures, such as the bladder, ureters, the rectum, etc., and unless the pelvis is small, or the head very large, or unless some tumors of the bone or of the uterus or of the ovaries are in the way, progress in labor is usually certain. The floor of the pelvis is formed by muscles which swing from either side of the bony pelvic wall toward the middle line, attaching themselves in the middle line to the lateral margins of the sacrum and coccyx, and in front of that, uniting to each other. This union in the middle line of the floor of the pelvis is perforated to allow the rectum to pass through and the vagina to pass through. As the head is passing through the pelvis, it is passing out from the uterus into the vagina and passes down through the vagina, toward the pelvic bony outlet and through the pelvic floor. In the usual normal process, the back of the child's head strikes the symphysis and rests under the arch, the head being flexed decidedly. In the further progress downward, the back of

the child's head, or the occiput, being fixed in the arch, the head is born by the process called extension, *i.e.*, the stage of flexion is gradually diminished and changed into the opposite form known as extension, so that the forehead gradually comes into view, and then the nose, mouth and chin. Extension takes place over the posterior wall of the vagina, over what is called the perineum.

The Perineum.—The perineum (or perineal body) is a wedge-shaped area composed of muscles and covered by skin, which lies between the posterior wall of the vagina and the anterior wall of the rectum. This perineum has to be stretched very decidedly, so that the lower end of the vagina becomes large enough to allow the child's head to pass out. This perineal body is placed between the vagina and the rectum so that stretching may take place without injuring the rectum or tearing into it. If the perineum is torn too much, the tear may extend into the rectum. As the head is passing out through the bony outlet, the bladder is pushed up above the symphysis, and the urethra, which is the outlet from the bladder, is so compressed that the patient cannot empty the bladder. As the head passes through the bony pelvis it presses down on the rectum so that if any fœcal contents are present there, they are pushed out gradually as the head passes down. Hence when labor begins precautions ought to be taken to empty the bladder and also the rectum. If labor lasts too long and the pressure on the bladder and the rectum is too great and severe, the tissues may be injured very decidedly. The rectum is almost never injured by the pressure, but may be entered if the perineum is completely torn through.

Progress of Second Stage.—During the second stage of labor the patient is, of course, in bed. She

rests upon a Kelly pad over which has been placed a large sterile towel, preferably a Turkish towel. She wears a pair of sterile leggings, a short coat to which the leggings are fastened and over the vulva a large sterile pad or sterile towel. The patient has been clipped or shaved and a sterile external washing with lysol solution has already been carried out. Before the second stage is reached, in fact, as soon as the patient goes into labor, an enema should have emptied the lower bowel of all its contents, and the patient is supposed to have voided, that is, to have emptied her bladder, and if she cannot do so again after a certain number of hours, a catheter should be employed.

As the pains grow stronger, the patient usually cries out, she feels a desire to bear down and press, the voluntary action of the abdominal muscles supplements the uterine contraction and is of the greatest aid in advancing the child down to the perineum. At the height of each pain, the patient should fill her lungs with air, close her mouth, and bear down hard as if at stool. In addition to stopping her outcry, this concentration on the action of the abdominal muscles is often of essential help. Patients often bite upon a handkerchief or a piece of gauze during the pain. Ofttimes they take hold of the bars of the bed, at their heads, and so get a hold that is of aid in bearing down. A twisted sheet may be rigged to the head or foot of the bed on which the patient may pull when bearing down. The pains are not so sharp as in the first stage, and they reflexly prompt action on the part of the voluntary muscles of the abdominal wall and so distract attention from the severity of the pain.

As the head comes down more and more through the vagina, a more decided sense of pressure on the rectum is experienced, and the patient says that she feels as if her

bowels were "going to move." As a matter of fact, later on as the head progresses downward still further, it squeezes the rectum so that it does express from it retained fœcal contents, sometimes quite a large amount. The first sensation of pressure on the rectum is a sign that progress is being made. The feeling that the bowels are "going to move" is further proof of additional advancement. Expression of fœcal contents from the anus shows that the head is nearing the perineum. Very soon the head begins to appear, and then we know that the last part of the second stage is before us. In this period chloroform is administered according to the following method or "laughing gas" is used.

CHLOROFORM OR "LAUGHING GAS"

An anesthetic is given to the patient about a half hour before the head is born. Before this point is reached, the patient is helping the labor along very decidedly by bearing down and pressing with her abdominal muscles during each pain or contraction of the uterus. This is of the greatest help in pushing the child down further and further through the vagina.

When the head has come down so far that it is almost visible, one notes that the anus begins to spread and become larger, and that the vulva begins to open out a little bit during each labor pain. This means that the head, practically speaking, is on the perineum if it is far enough down for the extension of the head to begin.

Extension of the head means that in the ordinary normal position, the back of the head, known as the occiput, is underneath the symphysis, the bone which lies along the upper margin of the vagina. The top of the head, the face and chin have to pass over the so-called perineum.

This is accomplished by the movement called extension, that is, the baby is coming down with its head flexed, its chin resting on its neck.

When the occiput is fixed under the symphysis, the head is extended, and through this movement of extension it comes out over the perineum. With each respective pain, more and more of the head of the baby appears through the vagina and out through the vulva, dilating the opening and putting the perineum and the sphincter of the rectum more and more on the stretch so that the sphincter ani, or the part of the rectum visible to the eye, is stretched to several times its normal diameter.

This process is supposed to go on slowly, each extension of the head stretching all the parts over which it is to pass. Between the pains the head recedes a little and sometimes more or less completely. The more regularly and the more rhythmically this process occurs, the more thoroughly are the soft parts stretched and the less is the danger and risk of tears taking place.

When this manipulation is at its height, the head finally comes out far enough so that it does not recede between the pains. The patient during this process, if no anesthetic be given, finds it most difficult to resist bearing down and pressing, there is in many cases an almost uncontrollable tendency to squeeze down and press the baby out. If this is done by the patient, contrary to the orders of the physician, the head is forced out so quickly, with two, three or four pains plus pressing on the part of the patient that tearing of the soft tissue is bound to result.

If chloroform is administered slowly and carefully, during or after each pain, the patient's sensation of pain is utterly diminished, and finally the patient is allowed to go almost entirely under the influence of the chloro-

form. The disadvantage of allowing the patient to remain entirely under the influence of the chloroform is that we lose the aid which she gives us by her pressing and the contraction of the abdominal muscles. Even when the patient is not entirely conscious of what is going on, so long as she is not completely under the influence of the chloroform, she still unknowingly aids us by the pressing which she carries on.

When, however, that point is reached where no rapid contraction on the part of the uterus is wanted, and no active pressure on the part of the patient is desired, a little more chloroform is given so that the patient is completely under. Then only the uterus is at work and the head can be brought out between pains.

The idea, during the last three to five minutes of the delivery, is to allow the head to gradually come out without any violent contraction on the part of the uterus or any added pressure on the part of the patient. There comes into appearance, first the occiput, then the top of the head, then the forehead, then the eyes, then the nose, then the mouth, then the chin.

While this is occurring, the perineum is being protected by the hand covered with a towel which presses up against the perineum above the rectum, so that the head comes out upward, toward the ceiling as it were, and no tearing of the perineum results. After the head is out, there is a rest allowed for a moment, and then the succeeding delivery of the body takes place.

One may wait for the uterus to contract and expel the same, or one may by gentle traction in a special manner, gradually pull the body of the child outward. The child is pulled in such a manner that the so-called upper shoulder rests underneath the symphysis or the posterior shoulder

rests on the perineum. If the upper shoulder has been fixed beneath the symphysis, the lower or posterior shoulder, which is on the perineum, is delivered out over it. If the posterior shoulder is fixed on the perineum then the anterior shoulder is born under the symphysis.

If, during this manipulation, the hand, covered with a sterile, moist towel is not applied over the perineum exactly as was done when the head was being brought out of the vagina, the perineum may be torn. Once the shoulders are out, the extraction of the remaining part of the body occurs readily, and this is accompanied and followed by expulsion of the still retained waters present behind the baby. The child is then made to cry. It ofttimes cries of its own accord, and after it has cried for a minute or two, the cord is then tied in a manner to be described subsequently. During all this manipulation by which the head and body are expelled, the patient is under the effects of the anesthetic to such a degree that she has absolutely no recollection of the birth of the baby and has experienced no pain or suffering during the last quarter hour or half hour of her delivery.

"Laughing gas" may be used at various periods. A special apparatus even allows the patient to administer it to herself in such a way that the gas is shut off so soon as the patient is sufficiently affected. With this method or by administering it with the aid of a physician or nurse, nitrous oxide or "laughing gas" is of great aid. I find chloroform of great help. It alleviates the pain. Only a very small amount is needed when properly given.

Pituitary Extract and Chloroform.—My usual procedure with chloroform is to wait until the head is on the perineum. The idea is to further delivery, without too active propulsive efforts on the part of the patient, and without her experiencing the exquisite pain.

A few drops of chloroform are put on the mask and held over the patient's face. This is done just after the recurrence of each pain. So soon as the talking and tossing stage has passed, the patient may be kept more or less quiet by these few drops of chloroform administered at the time of pains. If necessary, a few drops are given between the labor pains.

The immediate effect of the administration of chloroform is to diminish the frequency of the pains and their forcefulness, hence it is customary, after an interval of a few minutes, to give a third of an ampoule of pituitary extract. Then, not infrequently, the pains begin to come with force, the patient evidencing a certain amount of abdominal pressure with each pain, and additional chloroform must be given.

When the occiput has appeared beyond the vulva and there is no longer recession between pains, chloroform is given a little more generously so that the patient's abdominal muscles do not act by reflex.

If a period of quiet sets in at any time, and the head of the fœtus does not advance, a third of an ampoule of pituitrin may be given. One must remember the cumulative effect of the two or three doses, as contraction on the part of the uterus may result, which nothing can stop—especially if the patient comes out enough to use voluntary pressure.

One must support the perineum and extract the head between the uterine contractions. Then one hand must remain on the perineum, protecting it from injury by the shoulders, and the other hand, by traction, brings the anterior shoulder under the symphysis, when the posterior shoulder makes its exit over the perineum without injury to that tissue or *vice versa*. The second stage is over as soon as the child is born.

THE THIRD STAGE OF LABOR

As soon as the child is born and has been made to cry, the cord is tied. The patient is then put on the douche pan, which fits within the Kelly pad, and the third stage is awaited. This stage means the expulsion from the uterus of the placenta and the membranes which are known as the "after-birth."

Although this procedure is not carried out by many men, I always administer one teaspoonful of ergotole in water just as soon as the baby is born. The point to be watched for now is the possibility of hemorrhage. For instance, the placenta may be loosened in part only, the uterus may not contract, hence the uterus will bleed from that part from which the placenta has been separated, namely, the placental site. The best way to treat this condition, if it should occur, and the best way to avoid this annoyance and prevent its occurrence, is to empty the uterus of the after-birth without much delay. The usual practice is to wait twenty or twenty-five minutes, because during this period the uterus contracts and relaxes, contracts and relaxes, and in this way separates the placenta from its contact with the uterine wall. It is my practice to wait only about five minutes, and then to express the placenta by the method known as the Credé method, which consists of grasping the uterus through the abdominal wall with the thumb and four fingers of one hand, and by squeezing these together and pushing down on the fundus of the uterus, to force the placenta and the membranes out. The advantage of this method is that the third stage lasts only

a short time. After we expel the placenta, with a hand upon the now emptied uterus, we are able to exert a certain amount of pressure and stimulation upon the uterus, and so prevent the uterus from relaxing.

During the progress of the second stage, the nurse must prepare two fountain syringes filled with hot water at a temperature of 110° to 115°. These should be ready in every case. Into one of them several ounces of dilute acetic acid may be poured, to be used if needed, to check hemorrhage. The other consists of an antiseptic solution such as lysol or tincture of iodine. The latter is used if for any reason an antiseptic vaginal douche is indicated. It is only indicated occasionally, after the use of instruments or considerable intra-vaginal examination or manipulation. Each fountain syringe is fitted, ready to be used, with a long glass sterilized nozzle. This is introduced into the vagina or into the uterus as an irrigation if the uterus does not contract. The acetic acid solution is used for this purpose. It has a powerful action in stimulating the uterus to contract in those cases where it does not do so and where bleeding for that reason is continuous. However, massage of the uterus after expressing the placenta, plus the previously administered ergotole, plus the action of the pituitary extract which may have been used during labor, or which may now be administered in the third stage, serve in practically all cases to overcome any atony or complete relaxation of the uterus with failure of proper contraction.

Bleeding from the placental site occurs only when the uterus does not contract thoroughly. The uterus cannot contract thoroughly unless it be empty or emptied. Hence the reason for the previously mentioned procedure of expelling the after-birth.

After the placenta has expelled itself or been expelled by the Credé method, the patient, while still on the douche pan, receives an external irrigation of two or three pitchers of lysol solution, a 1 per cent. solution being used. Then the Kelly pad, with the superimposed douche pan, is removed, and the patient rests on a quilted pad which has been placed underneath at the beginning of the labor.

Under this, of course, a large rubber sheet has already been placed by the nurse. All competent nurses understand how to drape a bed with rubber sheets and with quilted pads.

After the subsequent cleansing of the areas around the vulva, a large piece of iodoform gauze is placed over the vulva. Over this is placed a large sterile pad, and then a T-binder is applied, one part of the T-binder going around the abdomen, the other part going over the sterile pad tightly in front to the part about the abdomen. The leggings are then taken off and the patient rests upon a clean, neat dressing, and perfectly at ease. If, in spite of the greatest care—and this sometimes will occur as a result of the after-coming shoulders—a tear of the perineum has taken place, stitches are put in immediately. They are best put in with the patient on the douche pan, because that procures the proper elevation. Two, three or four stitches are put in, better before the placenta is expelled, and no anesthetic need be given. The parts have been so stretched and benumbed by the birth of the baby that they are relatively insensitive. Passing of the sutures hurts a little, the tying of them hurts a little, but the pain is not sufficient to warrant the use of an anesthetic.

Aseptic Care.—During the progress of labor, everything must be done in the most thorough, aseptic manner. The physician must wash his hands in the most sterile manner as

if for an operation, using tr. iodine for the tips of the fingers, and he should wear gloves during every step wherein he comes in contact with the patient's birth passage. The leggings which the patient wears should be sterile, the towels on which she rests should be sterile.

Every examination which is made should be made under the most aseptic precautions. The patient is placed on a douche pan, should wear leggings, a lysol solution is poured carefully over the vulva. The hands after thorough preparation are encased in a pair of sterile gloves which are dipped into lysol, no vaseline being used. In the various procedures associated with the birth of the baby, such as examinations, protection of the perineum, etc., the doctor wears a sterile gown in addition to sterile gloves.

Just before the baby is born a large sterile sheet is draped across the bed, carried up under the feet of the patient, placed close to her buttocks. Then when the baby is born, it is placed on this sheet and the cord is tied. In the care of the cord the same aseptic method is necessary. If it should be necessary to sew the perineum, a fresh pair of gloves must be used. In other words, with each examination, with each act during the progress of labor performed by the aid of the fingers, sterile gloves should be used.

The baby's eyes should always be washed with protargol solution 1 per cent. Several drops are placed in either eye three times every day for the first two days.

POST-PARTUM STAGE

After the first dose of ergotole has been given, the patient, after an interval of half an hour, is given another half teaspoonful, and after that for several days half a teaspoonful of ergotole in water is given every three or four hours. Then, after a few days, the dose of ergotole is diminished or the interval is increased. It is my practice to continue the administration of the drug for at least ten to twelve days, and in cases where lochial discharge persists, and in cases where the uterus is not contracted sufficiently, it is continued for many weeks, sometimes for months. This is the case in many instances where the patient does not nurse, for patients who nurse their children have a uterus which returns to the normal size more readily and certainly than those who do not nurse.

The uterus, for several days, during the process of contracting expels blood, generally in fluid form, sometimes in clots. This gradually grows less in amount and paler in color, and in a few days is no longer blood-tinged. This discharge of blood, and later of a whitish secretion, is called lochia. It should not have a disagreeable odor. If any part of the membranes or a bit of placenta be left in the uterus, or if blood in small amounts be retained in the uterus, by its tipping back into an abnormal position, bacteria called saprophytes may grow on these no longer living tissues and secretions, and give a disagreeable odor to the lochia. This condition is not an infection or "blood poisoning," for on cleaning the uterus of these contents the character of the lochia becomes normal.

In the latter weeks of pregnancy patients often suffer from hemorrhoids due to the congestion produced by the pressure of the enlarged uterus and the interference with the venous circulation.

After the baby is born the anus, which has been tremendously stretched, is not infrequently distorted by the presence of new hemorrhoids or an exacerbation of the annoyances due to the old ones. This is an annoyance from which very many patients suffer, but the hemorrhoids usually shrink, dry up and disappear without any subsequent trouble. If the annoyance be treated, suppositories of various sorts, especially anusol suppositories, give great relief.

It is customary, forty-eight hours after labor, to give the patient in the morning a large dose of castor oil. This cleanses the gastro-intestinal tract without having any interfering effect upon the activity of the breasts. Other drugs, such as compound licorice powder or any of the aperient waters, may be given. The disadvantage of giving aperient waters is that they withdraw a certain amount of fluid from the system and interfere, to a certain degree, with the swelling and activity of the breasts.

After this, the patient is given regularly every night one or two pills which are supposed to act upon the intestines. The intestines rarely perform their function thoroughly because the patient is lying down, there has been a certain amount of pressing and atony of the lower bowel, and it not infrequently is necessary to give enemata. These may be made of soap suds, or of milk and molasses in equal parts, or any other combination which the physician finds valuable.

After the labor has been completed, it is wise as a rule to give patients a cup of hot milk or hot tea, because they not infrequently shiver and have chilly sensations. This

is not due to temperature. It is due to some sort of a systemic reaction, due to the strain of labor.

Diet.—The diet of the patients in the first few days after labor consists of almost everything but meat. They should be given plenty of milk, milk with a little coffee, tea and milk, soup, rice, oatmeal, any of the cereals. Oatmeal is the best cereal because it seems to have an excellent effect in stimulating the milk secretion. Eggs, toast, milk toast and other foods of that sort are readily administered. After the first three or four days, the patient may be placed on a full diet, being fed at frequent intervals. It is wise to feed the patient every three or four hours, paying particular attention to large amounts of milk, or milk and cream, large amounts of butter and the cereals, orange juice, and stewed fruits. Patients ought to have very little in the way of company in the first few days, it being wise to wait until the milk secretion is well established. Any annoyance, any irritation, too much strain in seeing people, too much attention to what is going on in the household, have a rather hindering effect so far as the milk secretion is concerned.

CARE OF THE CORD

The cord should always be tied twice for the sake of safety, once very near the attachment to the skin, and once about half an inch distant from that. I always touch the raw surface of the cord with a little 3 per cent. tincture of iodine. The cord is then dressed as follows: A square sterile piece of gauze is used and through the center a hole is made. The cord stump is drawn out through this hole in the gauze and rests upon the gauze. The cord is then liberally sprinkled with dermatol powder. Over this are then placed two or three square pieces of

sterile gauze, and the little belly band is then applied. The subsequent care of the cord means putting, at various intervals, more dermatol powder upon it. This serves to keep it sweet and clean.

After six, seven, nine or ten days the cord falls off, leaving a rather raw surface from which a little secretion exudes. The nurse is then directed, each day when the baby is bathed (by the way, the baby receives no tub bath until the cord is off, previous to that having sponge baths) to put a few drops of dioxogen with a dropper into the raw surfaces. This is then dried up and a little dermatol powder is applied. This process is repeated every day until the umbilicus is restored to the normal.

BREASTS OF THE BABY

It sometimes happens that female babies show a little swelling of the breasts from which a little secretion is discharged, or may be discharged by pressure. When this occurs, all that is necessary is to paint the nipples carefully with a little compound tincture of benzoin and apply a binder over the breasts, not too firm, because that hurts the baby and makes it irritable. The breasts should not be massaged; the secretion should not be squeezed out. The wisest procedure is to leave them alone, apply the little breast binder, and they will gradually return to their normal state.

THE BABY'S HEAD

In being born through the brim of the pelvis and through the pelvic bones, then being expelled through the vagina, the head of the baby is formed into the most peculiar shapes. The top or occiput of the head is usually tremendously elongated, spreading out as a very large, oval projection.

Occasionally over this area there is a swelling composed of a more or less œdematous tissue. That part of the occiput over the external opening of the womb is not compressed by the lining of the vagina, being the part least pressed upon, and for that reason fluid may be poured out into the subcutaneous tissue. Occasionally as a result of pressure, even when no instruments are used, on one or two spots on the head little tumors or swellings form, in which blood has accumulated.

All these things take care of themselves, and disappear of their own accord if left alone. After three or four days the head has resumed its normal shape. It is truly a wonderful thing to see how supposedly malformed the head may be on birth, and this proves the tremendous importance of slow moulding and slow over-lapping of the bones to accommodate themselves to the size and shape of the bony pelvis. It is almost as remarkable to see how rapidly this malformation of the head disappears and the head resumes its nice round or oval form.

SUCKLING

Most babies take to the breast very well and suckle very nicely, even though during the first few days there is no real milk there, but only colostrum.

Occasionally babies will not nurse or take the nipple well—sometimes because the nipple is not large enough, sometimes "just because they won't." With a little patience a competent nurse can gradually train the little baby to apply itself to the breast and suckle well. This is all-important, because no method of which we have any knowledge exerts the same influence in stimulating the breasts to secretory activity as suckling does. The baby should be put to the breast at regular intervals, but I

believe that for a certain number of hours at night the mother should have rest, and the baby should not be applied to the breast.

It is wise to give the baby warm water, possibly with a little sugar in it, several times a day for the first few days. After the milk secretion is well established, it is not such a bad idea to continue to give the baby a certain amount of water from a bottle with a nipple every day. It is a great help to administer this water, especially at night, for the baby wakes, is hungry or thirsty, and cries, and ofttimes by giving it an ounce or so of warmed water once or twice during the night, putting it to the breast can be avoided. The baby's stomach will not be taxed too much, and the mother will not be deprived of her night's rest.

CARE OF BREASTS AFTER LABOR

Twelve hours after labor, the baby is put to the breasts alternately every two, two and a half or three hours, allowing, however, a certain interval during the night when the mother is allowed to rest.

The act of suckling is a stimulus. First, it contracts the uterus; second, it stimulates the breasts to secretory activity.

During the first three, four or five days the child is really not getting milk, but what is known as colostrum, as previously stated. This is a fluid almost colorless, but gradually each day taking on more of a deep gray, and finally a whitish color.

The action of colostrum is to stimulate the intestine of the baby to action so that it is cleared of the contents that were there at birth. The intestinal content is a chocolate-colored, creamy fluid called *meconium*. Then, as the breasts gradually fill up and milk begins to be secreted, the child's stool takes on a more yellow color, until finally the beautiful golden yellow, well-assimilated mother's milk passes through the bowels in a state of perfect digestion.

On the fourth, fifth or sixth day the breasts swell very much, in fact so much that they fill up under the arms of the patient and she is not infrequently very uncomfortable.

However, the act of suckling, as I said before, is a stimulant, and if the baby be a healthy one, the breasts are usually emptied at regular intervals sufficiently to prevent any annoyance.

There very frequently happens, in one or both breasts,

what is known as caking, which means that hard areas appear in the breasts where the milk, so it is said, "hardens."

The best treatment for this condition is regular and frequent suckling, for then the breasts are emptied continuously. This caking may be diminished in many cases by the application of hot cloths soaked in aluminum acetate solution, and constant wearing of a not too firm breast binder.

It is a good procedure to bind the breasts a little bit for the first few days, but as a general rule this is not necessary.

The binding up of the breasts is more to keep them from hanging down and being in an uncomfortable position than because of any influence upon the milk secretion.

Some physicians advise massage of the breasts to remove the so-called caked areas. It may be advisable in extreme cases when the baby does not nurse, but as a general rule the less that is done to the breasts, the less contact there is with the nipples, the safer is the procedure, so that during the first two weeks the care of the nipples is the more essential.

CARE OF NIPPLES

As soon as suckling is done by the infant, the nipples should be taken care of to avoid erosions, injuries, lacerations and infections. The nipples should be cleansed with a boric acid solution each time before the baby is applied to the breast. Then after the baby has suckled the nipples should be dried, and some antiseptic solution or lotion should be applied. A favorite application of my own is the compound tincture of benzoin. This is applied with a camel's hair brush after each nursing. Two or three coats are painted over the nipple over an area about the size of a silver dollar. This is allowed to dry (like collodion) and then a piece of sterile gauze is placed over the nipple

and allowed to remain until time for the next nursing, when the benzoin is washed off with boric acid solution and the baby is put to the breast. This compound tincture of benzoin should be applied with a sterile camel's hair brush. The camel's hair brush should be washed thoroughly with castile soap and water, and should then be kept in a little glass of alcohol all the time between applications. The purpose of the compound tincture of benzoin is to act as an antiseptic, to keep the nipples soft, and, above all, to heal the little cracks which occur through the pressure of the child's suckling. Glycerole of tannin is also very good. It is rare that any other treatment is necessary. Occasionally, of course, a little mild or stronger solution of nitrate of silver must be applied if the nipples "crack." In some instances the breasts are so sensitive because of little cracks or a little bleeding, or pressure of the child, that the nipple shield has to be used regularly till healing has taken place.

EFFECT ON UTERUS

The act of suckling has a marked effect on the uterus. Each act of suckling causes it to contract. The patient often complains of so-called "afterpains" with each nursing, and ofttimes there is an expulsion of blood, either fluid or in clots. This is one of nature's means and methods of causing the uterus to return to its normal size. In those cases where the baby does not nurse, the patient must be watched continually for a long period of time, and must be given appropriate drugs, especially ergotole, in order to bring the uterus back to its normal size. Even where nursing is carried out, the uterus must be watched, because one of the essentials of the after-treatment is the restoration of the uterus to its normal size and, above all, to its normal position.

STIMULATION OF THE BREASTS

The greatest stimulant to activity on the part of the breasts is regular and continued suckling.

There are instances, however, where the breasts do not fill up very well, and there are instances where the breasts do fill up, but gradually the amount of milk diminishes, or the quality of the milk is not up to the standard. Normal milk secreted from the breasts is very rich and creamy; the fats in it are very large in amount, and very finely separated. The physician may take a drop from either breast and put it under the microscope and tell the patient whether the milk is rich, whether there is plenty of fat in it, and whether the fat is beautifully and well subdivided. It is this amount of fat and its actual subdivision into small particles which makes it superior to cow's milk.

Properly selected food is an excellent stimulant for the breasts. Plenty of milk and cream, plenty of sugar, plenty of the starches, especially rice, oatmeal, etc., and plenty of butter. All these various foods have a tendency to stimulate the breasts to activity. Then there are drugs which have a pronounced effect in stimulating the breasts; among them is thyroid extract in small doses, which sometimes activates the breasts very well.

When the patient is up and about, takes her baths, goes out into the open air, very often the breasts take on a renewed activity, when, only a few days before, it seemed as if they would not be able to suffice for the nourishment of the infant.

Then, again, the amount of milk secreted may be almost sufficient but not quite, and the baby is put into the hands of a children's specialist, and one or two bottles a day are given in addition to the breast. Even if only partially fed on the breast for several weeks, or for three or four months,

the baby is given a start which is of wonderful benefit to it, far, far better than any aid which artificial milk combinations alone can produce.

The best way to tell whether the breast secretion suffices is to observe the weight of the baby. If the baby increases in weight, a number of ounces each week, if the stools are well digested, as they usually are, and if there is no annoyance in the way of green stools, then one may be sure that the milk is sufficient. If the baby cries very frequently, if it does not seem to be satisfied after nursing, if weight is not advanced each week, one may suspect that the milk does not suffice. Then an examination is made of the milk. One can readily tell under the microscope whether the milk is sufficiently rich or not, that is, whether there is enough fat. Insufficient fat is often the reason why milk is insufficient to provide the baby with all the nutrition that it needs. Then a competent physician adds one, two, or three bottles a day. Not infrequently it happens that the patient's general condition improves, and the bottles may be dispensed with. Even if bottle feeding is added, it is a wise thing to use the breasts, if possible, because the baby is getting a certain amount of milk from the breast which, as stated before, is of excellent value to it. In addition to that, from the standpoint of the obstetrician, suckling at the breast is an excellent thing, because no matter how much we may give drugs, nor how persistently we may use them, one never gets the same degree of involution of the uterus as one gets if suckling continues for ten to twelve weeks after labor.

A simple problem is the care of the breasts if for any particular reason the baby cannot nurse. Here, the breasts must be bound up with a tight binder and held

rather firmly, the patient's fluids should be diminished, rather more solid diet should be given, and the patient is given ointments which have a tendency to diminish the flow of milk to the breasts and to dry up the milk, or drugs are given internally which have the same effect.

Purging, which attracts a great deal of fluid to the intestines, is also advised, so that the patient's fluid is depleted into the intestines and less is attracted to the breast.

NIPPLE SHIELD; BREAST PUMP

Nipple shields are not infrequently necessary. First, the nipple may be so small that the baby cannot take proper hold. Second, the nipples may be hypersensitive, or cracked, and the act of suckling is painful, so that if nipple shields are used the cracks have an opportunity of healing.

The baby does not get the milk so well through the nipple shield as through the nipples directly, because the shield is often not in good contact and a certain amount of air enters, with the result that the baby in addition to getting milk is swallowing air, which is liable to produce colic. With proper care an efficient nurse can avoid this annoyance.

In other cases, for one reason or another, it may be necessary to use a breast pump and draw the milk from the breast if the breasts are secreting more than the baby can take care of.

In yet other cases the baby may not be well. There may be some reason for not putting it to the breast, and in these instances the breast pump must be used, and then the baby is fed with the milk obtained thereby. If the baby suckles well through the nipple shield, great relief is brought to the patient. If nipple shields be used,

if the breasts are emptied of their secretion, and if then this milk be fed to the infant, proper care being given to the nipples, these constitute precautions which prevent, in practically all cases, any great injury to the nipples, any great crack or fissure, and especially any infection. Through these little cracks or fissures infection may invade the breast, producing a deep-seated involvement or a superficial involvement which is known as a lymphangitis of an erysipelatous nature. Inflammation of the breast, if it does occur at all, occurs within the first two weeks, but an infection of the skin area may occur at a later period. There is then a slight reddening of the skin. The reddening may not be very marked, it may not be extremely sensitive, and yet it produces a profound constitutional change in the patient. This infection is of what may be called an erysipelatous nature, as I have said. It must be treated vigorously and rigorously, else trouble is liable to result.

It is remarkable how a slight area of inflammation around the nipple may produce a marked systemic reaction, with high temperature. On the other hand, infection may involve the deeper areas of the breast gland resulting in abscess formation.

It should be the purpose of the physician and the nurse to avoid this complication in every case. If the nipples are sore, and if infection appears, then the infected area should be thoroughly painted with tincture of iodine, and the breasts should be constantly covered with very hot large cloths immersed in aluminum acetate solution, over which is placed rubber tissue, and over this a towel or gauze. These hot applications should be changed every fifteen minutes in cases of genuine involvement of the breasts, of a deep or superficial nature.

AFTER-PAINS

After-pains are pains which are felt after the baby is born, and after the after-birth and membranes are expelled. This means that the uterus, which is going through normal and more or less rhythmical contractions all the time after labor, is giving pain. The uterus is at all times, after it has attained full development, undergoing rhythmical, regular contractions. This is for the purpose of keeping it in good muscular condition. During pregnancy the same thing occurs. This process is painless, the patient is not aware that it is taking place unless she occasionally feels by hand the hardening of the uterus. This, the physician readily feels. When the patient is in labor, the uterine contractions are increased tremendously in frequency and in power, due to stimulation by one of the internal secretory glands of the body.

After labor is over, and the uterus is empty, this organ contracts and relaxes, contracts and relaxes. This can be readily felt. The purpose of this procedure is to gradually bring the uterus back to its normal size and to empty the uterus of any retained blood, the relaxation being a process which aids the circulation, brings the blood into the uterus, and at the same time gives the muscle rest.

This process goes on in most cases without any annoyance to the patient, especially if the patient is nursing. However, most patients say that the act of suckling causes a certain pain in the uterus which is due to the fact that the act of nursing, through nerve reflex channels, causes the uterus to contract forcibly. Patients who nurse their

children have, in a much shorter period of time, a uterus restored to its normal size than patients who do not nurse.

Drugs may be given for several days after labor to keep the uterus contracted and to contract it more and more each day. These drugs do not interfere entirely with the relaxation of the uterus, but they do enhance the power and degree to which it does contract, for the periods during which they are given.

Now, in some patients, after-pains—sometimes very severe—occur; in other words, the uterus contracts so forcibly and powerfully as to give the patient pain. In some instances this is due to the fact that clots accumulate within the uterus. In other words the blood, instead of flowing out in a fluid form and forming lochia, as explained, coagulates within the uterus. When the uterus contracts with force to expel this clot, the clot is forced out through the neck of the womb, and anything which stretches or dilates the neck of the womb causes pain.

In other cases, it simply means that the normal contractions of the uterus are ultra-powerful and cause the patients pain. Some patients may have a hypersensitive organism, or they may be hypersensitive so far as the contractions of the uterus are concerned.

The best way to avoid after-pains is to aid the uterus in its contractions, and to keep it more or less contracted and allow less of the relaxation. This is very well done by giving ergotole in certain doses, more or less continuously.

In other instances the pains are more severe, and an occasional hypodermic must be given to overcome the exquisite pain felt at that particular time, and then after a day or two, when the appropriate drugs, which are supposed to contract the uterus, have exerted their effects, the after-pains cease.

It is my practise to give all patients, whether they nurse or not, ergotole for several days after labor. The purpose of this is to avoid the possibility of excessive bleeding. It contracts the uterus and makes it finally go back to its normal size more quickly, and if there be any danger of infection, through some manipulative or operative procedure, the contracted uterus is a less fertile field for bacterial growth than a relaxed, flabby organ.

It is always well, in attending the second, third or fourth confinement of a patient, to inquire whether after-pains were present in the first or second or third confinement, because then appropriate measures may be taken, a little more extensive than the ones mentioned to avoid their return. They are not a very frequent event, but in some instances they are extremely painful and retard the easy convalescence, which should follow most cases of pregnancy and confinement.

POST-PARTUM CARE

The period which succeeds the birth of the baby is called the post-partum period.

During this stage, the mother is in bed for from eight to ten days nursing the infant, and is up and about on the twelfth to the fourteenth day. Some physicians allow the mother to get up for varying periods on the third to the fifth days. The important steps which are now to occur refer to the restoration to the normal of the uterus, and the other structures associated with the uterus known as ligaments.

RETURN OF UTERUS TO NORMAL SIZE AND POSITION

After a definite period of time, the uterus ought to return to its normal size, to its normal position: the abdominal wall should regain most of its elasticity, and the various ligaments associated with the uterus should contract down to a state where their elasticity will hold the uterus in its normal place.

These various steps are known as *involution*. Any failure of involution is known by the term *subinvolution*. The act of suckling, in addition to being of the greatest advantage to the baby, is of great advantage to the mother because it aids in contracting the uterus and makes it gradually close down and regain its former muscular tonicity and its proper size.

If the mother nurse continuously and has sufficient milk

for the baby, the uterus will, in the course of a few weeks, barring malposition, return to its normal size, or become smaller than normal. If the mother does not nurse, then medicines must be given to contract the uterus and bring it back to its normal state. It is wise practice, in all cases after the baby is born, to give a drug which will restore the uterus to its normal size. The most important drug for this purpose is ergotole. Another important drug which is given for this purpose is pituitary extract, which is administered by hypodermic needle.

Ergotole is continued in these cases sometimes for weeks and weeks. As a general rule the patient should be examined ten to twelve days after her labor in order to see the size of the uterus and also to note its position.

The uterus should return gradually and steadily to its normal position. However, the act of lying in bed, the fact that the patient is not up and around, for the first few days, plus the heavy weight of the organ, plus the fact that it may have been more or less actually displaced before she was pregnant, all tend to force the uterus to a position known as retroversion or retroflexion.

Hence, patients should be allowed to spend little time flat on the back. They should be on the right or left side alternately. After the first six days patients should spend an hour in the morning and one hour in the afternoon lying flat on the face. This practice, plus additional hours of this posture at night, should be continued for weeks.

If the patient does well, she may use the commode at the bedside after the first week. Some excellent obstetricians suggest the method earlier, but it is wise to wait till the patient has gone through the breast-filling stage.

Beginning with the sixth day, additional pillows are used, and on the ninth or tenth day the patient sits up in

bed for long periods. After the tenth day sitting in chair is permitted, and some walking is done.

An examination twelve days after labor gives us an idea as to how fast the uterus is returning to its normal size and whether it is gradually getting back to its normal position. These examinations must be repeated at intervals of a week or so, for many weeks afterward, in order to gain an idea as to whether involution is progressing satisfactorily. Thus a physician may accurately judge of the doses of ergotole which are to be given and of the period of time during which this drug is to be administered.

If two or three or four or five or any number of weeks after labor, the uterus is found to be falling back, it should be supported, that is a pessary should be introduced to hold the neck of the womb high and far back, which throws the fundus or body of the womb forward into the normal position. If the uterus, large and subinvoluted, if the ligaments, not yet restored to their normal elasticity, are given a chance to return to their normal state, and if during the time within which this is being done, the uterus is held in its normal place by a pessary, one may, at the end of twelve or fourteen weeks, or later, remove the pessary and have the pleasure of seeing that the uterus remains in proper position.

If this constant control is neglected and the uterus is allowed to fall back without the knowledge of the physician, and this discovery is made only many weeks after labor, it is, of course, possible to lift the uterus up into its normal position and hold it there by a pessary, but the probabilities of its holding its place after the pessary is taken out are decidedly diminished.

To summarize this whole question in a few words, we may say that if the uterus is made to involute by nursing

or by drugs or both, and if, at the first sign of a malposition the uterus be supported in its normal place, then when full involution takes place, in a goodly percentage of cases the pessary may be taken out and need never be worn for any length of time afterward.

RETURN OF CIRCULATION TO NORMAL

Involution also refers to the blood circulation in the pelvis, that is, in the uterus and around the ovaries and in the ligaments. If circulation is not restored to the normal and congestion persists, involution is interfered with and a state probably productive of annoyance ensues.

The patient's general circulation should also be restored to the normal, so that the various organs of the body are properly nourished and congestion is not allowed to develop in the abdomen or in any other portion of the body.

To aid the circulation one begins on the fourteenth day or a little later with baths. Salt baths are given, each full bath at a temperature of 100° or less, containing 3 to 5 pounds of sea salt. Later on, to this bath calcium chloride is added in varying amounts, and in necessary cases, carbonic acid gas is added, so that, when the bath is given with these various ingredients, the patient is taking what is called a Nauheim bath. The advantage of these baths is that they diminish the congestion in the pelvis, they improve the patient's general circulation, bring the blood more readily to the surface of the body, and aid in restoring tone to the action of the heart. In addition to this, these baths have a decided stimulating action on the patient's nervous system and nervous activity.

THE ABDOMINAL WALL AND THE PELVIS

The abdominal walls should be restored to their normal state, that is, the muscles should be given exercises of a

particular nature. By such exercises we give them the opportunity to do work and be restored to a state of tonicity which is essential to recovering what may be called "a straight front." These exercises improve the pelvic circulation. Over 60 per cent. of the body's blood can be accommodated in the abdomen and pelvis. If the general circulation permits this to take on the form of congestion, then local and general tone is lost, indigestion and malnutrition may result and involution will not take place. The average patient considers that she is out of the hands of the accoucheur two or three weeks after her labor. As a matter of fact, after the patient is up and about, there should be regular visits to the physician's office, so that the doctor may be sure that restoration to the normal is taking place in a gradual and steady manner.

This is much more essential in women who are not nursing than in those who are. But even if the patient nurse, she must be steadily observed until the doctor learns that she is as normal as treatment and care can make her.

For some weeks after labor there is great congestion in the pelvis, the ligaments and other structures are still filled with more blood than is normal, the cervix and neck of the womb are very blue, and ofttimes patients lose more than a normal amount of secretion, the vagina is often blue and not restored to its normal pinkish-red color.

Local treatment of a very mild character enhances the rapidity with which healing changes are brought about, namely, changes whereby the circulation becomes normal, not too much, not too little, whereby the nutrition of the parts is well conserved. Even if, during the examination made at the patient's home, the uterus is found to be going back to the normal size and position, repeated examinations are necessary to be sure that this state is

progressing, for ofttimes, three weeks or four weeks or five weeks after the patient has left the physician's hands, it will be found that the uterus is not yet back to the normal size and that its position is changing gradually to a backward tipping.

This is the time, on the appearance of the first annoying symptoms, so far as examination is concerned, to do something to lift the womb up and stop the annoyance and irritations which otherwise are bound to result, and to introduce a pessary or support to keep the uterus in proper position. For, if at this time the uterus is supported and held in place until it returns to its normal size, and till all the structures return to their normal elasticity, subsequent operative procedure is frequently avoided.

In addition to this, the patient must be watched as regards her general condition. We must note whether anæmia is developing, whether the strain of nursing is having too profound an influence on the general resistance. Also care must be taken to see that the patient's nervous condition is coming back to what is called a quiescent, peaceful state.

No matter who is taking care of the baby, no matter who has charge of the feedings, the actual care and attention of the mother still belongs and should be in the hands of the accoucheur. Too prolonged nursing has a decided effect on the womb, because it makes it contract very much, and in some instances it is difficult to reëstablish menstruation. In other words, too prolonged nursing may be too great a strain for the mother. As the mother is the first consideration of the obstetrician his word ought to control the degree and time to which nursing should be extended.

THE NERVOUS SYSTEM

A feature which is often overlooked is not alone the restoration of the abdominal walls to a state of elasticity, and the restoration of the patient's general circulation, but of her nervous system to a state of normal equilibrium.

Many patients, at varying periods after their labor, suffer from nervous annoyances which are characterized by their families or by the family physician, as nervousness, or hysteria, or neurasthenia. Grave injustice is done in this way to many patients who are suffering from an altered metabolism or an altered relation between the various gland secretions.

The patient's nervous state is very, very often controlled and influenced by the secretion of the internal glands. Of these the ovary is a very important structure. Among the others are the thyroid and the hypophysis.

A proper relation or balance between these various internal secretions aids in keeping the patient in a normal state. A faulty relation between these various secretions may have a very profound influence. The patient may be over-stimulated, excessively nervous, irritable and cross. On the other hand she may be under-stimulated, depressed, melancholy, weak, tired and sleepy.

This altered relation has been superinduced by the labor with or without subsequent lactation. In many of these patients the thyroid gland is over-functionating because the ovaries are under-functionating. The patients are nervous, irritable, cross, almost maniacal in their restlessness. They have a rapid pulse, have a tremor of the hands, they do not sleep well, they feel that their condition is not what it ought to be. This is not simply nervousness. This is not a condition over which the

patient has any control. It is a sad thing to see a patient depressed and unhappy because she feels that she perhaps lacks will power and so is responsible for her lack of tone. She may be told by her family or by her physician to "brace up," "buck up," and forget her annoyance, but as a matter of fact, she is absolutely a sick person, her nervous system is irritated and annoyed by various anomalies of her internal secretions.

I know of no more grateful class of patients than those who are told that their condition is one which often supervenes upon pregnancy, and that time and care and appropriate drugs will gradually restore them to the normal. They feel as if a load were lifted off their shoulders, they feel once more innocent of the charge of not having the courage or the "nerve" to be well.

Pregnancy is a severe test of a patient's physical and nervous resources. There are certain patients, many of whom are tall, narrow chested and long-waisted, who have no adipose tissue, who have a lack of elasticity and tone, who are so affected by one pregnancy that we may say that they never afterward recover the tone, elasticity and energy which they have lost, especially if the original qualities of tone were not above a low average. A good recovery, a restoration to normal elasticity after one confinement will probably be attained in the same manner after subsequent confinements.

On the other hand, a low state of energy resulting after one pregnancy means that a second pregnancy or subsequent pregnancies will leave the patient still in the same condition. This does not mean that a second pregnancy should not be permitted, because after all, in some patients, the very fact of being pregnant, contrary to all expectations, is a stimulus, and the patient is no worse, and will be no

worse after her second baby than the state to which she was brought after her first.

The more rapidly, the more certainly, and the more steadily the various procedures are carried out shortly after labor, the more sure we may be that the best possible restoration to the normal will be gained.

If the patient first comes to us, some time after her confinement, in the state to which I have drawn attention, it is exceedingly more difficult to accomplish a perfect result than if the patient were seen and treated earlier.

I consider that the post-partum period of observation for the average patient requires at least three months. For a large number of patients a period of six months is requisite, and for a certain small proportion, by no means exceedingly small, a year or a year and a half of continuous observation, continuous advice, proper vacation, the selection of a proper climate, the freedom from care and responsibility and the assurance that all will go well in the end, are necessary before we can feel that the patient is really discharged from our hands.

RETURN OF MENSTRUATION

If the patient continues to nurse, menstruation remains absent for varying periods of time. In some patients it is absent for two or three months, in others as long as twelve or fourteen months, if they nurse for that length of time.

The average period during which menstruation remains absent, if the patient is nursing, is from four to eight months. If patients nurse for more than eight months, it not infrequently happens that menstruation fails to return for a considerable period of time, and in some cases, unless energetic measures are taken, it may not return for months

or years. In these cases of so-called *lactation atrophy* it requires energetic treatment in the way of local therapy and in the way of administration of drugs to bring the uterus back to menstruation, and restore the ovaries and uterus to their normal activities.

If the patient does not continue to nurse, she may menstruate four weeks after her labor, or eight weeks after, and subsequently will menstruate regularly, sometimes a little ahead of time. In many instances the first and second menstruations are rather profuse. This is particularly so in patients who have nursed for a month or two and who have not menstruated. Then, on cessation of nursing, the next menstruation is rather profuse.

LABOR IN HOSPITAL

First confinement is best taken care of in a sanitarium or a hospital. The reasons which seem to be in favor of this procedure are numerous.

In the first place, the first labor is usually rather long, the risk and danger have not been thoroughly tried out. There may be a rather small, bony pelvis, the soft parts may be rather small, and the cervix and perineum may be very hard and resistant. The patient, in other words, has not been put to the test.

Aside from this, any one of many operative procedures, of a major or minor nature, may be necessary. These can most faithfully be done in a hospital or sanitarium, and some of them should be attempted only in hospitals or sanitariums.

If the labor is a prolonged one, and if we are uncertain as to whether the baby can be born by natural means, and if we are uncertain whether instruments must be used, the patient must be watched carefully and examined under most careful aseptic precautions. This necessitates observation by competent assistants who are generally found in a hospital.

If it be found that instruments are necessary for the extraction of the child, then a suitable operating room is at hand, whereas in a private residence or an apartment there is a great responsibility in making certain that everything is prepared thoroughly, and that all the steps in the preparation of the case are done in an aseptic manner.

Then, again, comes the question of the anesthesia. If

done in a private house or an apartment, an anesthetist is called for, or the nurse gives the anesthesia, all of which procedure means delay, a lot of uncertainty, and no assurance of good work; whereas in the hospital, competent anesthetists are at hand, and ofttimes a very mild anesthesia, only with nitrous oxide, is all that is needed. If, for any reason, the labor must be completed in a hurry, and stretching or dilatation of the neck of the uterus is to be done, proper assistance is to be had at the hospital.

If instruments are applied for the extraction of the living child, there comes a time when the head is born and pressure upon the abdomen may be necessary, the aim being the rapid expulsion of the body. Here, again, competent assistance is really better in the hospital. If the perineum is torn (and sutures should be immediately inserted) the procedure is much more readily carried out in a hospital or in a sanitarium operating room.

If a cesarean section be the procedure decided upon, the patient is there ready for the operation, and there is no delay in transporting the patient, which generally jeopardizes her welfare and the life of the infant.

Slight accidents of various kinds may occur in the early stages of labor, such as a prolapse of the cord, which means that the cord falls down before the presenting part. To replace the cord into the uterine cavity, thus allowing the head to find its way out without pressing on the cord, is a delicate procedure and requires assistance of the right sort. If, on the other hand, this falling of the cord requires the doctor to do a cesarean section, then no time is lost, and the life of the infant is saved by the promptness with which this operation is carried out.

In the very last stages of the labor, when the child's head is coming out over the perineum, the patient ought to be

given laughing gas or chloroform in every case, unless some other indications exist. At the same time pituitary extract ought to be given because anesthesia has a tendency to delay the progress of the labor. This is work enough to keep nurses busy. As a rule, the nurse is compelled to give the anesthesia, hurries to give the pituitary extract, has to help with the patient in keeping her knees apart, and, all in all, the procedure is an extremely onerous one in a private house.

If it should be found necessary to turn the child, so that the legs are extracted first, then again we have to put the patient under anesthesia, she has to be put on a table, the knees have to be held up with leg holders, sterile precautions have to be observed, assistance in extracting the child is often required, pressure on the abdomen for the extraction of the head is required, and this again is a procedure in which the valuable assistance of the house staff of a hospital cannot be over-estimated.

Any physician who has done a manual dilatation of the cervix, and has used instruments, or has done a version, or has had a difficult extraction with forceps, or has had to use operative procedure of minor sort realizes the care, and responsibility, and the danger when these procedures are carried on anywhere except in a hospital or sanitarium operating room.

Then, again, comes the question of the child itself. Sometimes it is necessary to spend more than a few moments in attempts to make the child breathe and bring on a thorough and proper respiration. The patient's welfare, in the meantime, is important, and the house staff of a sanitarium or a hospital are of invaluable aid in this procedure.

One never knows at the beginning of a case how few or how many of these various complications may arise

at one and the same time. Hence, to be properly prepared for all eventualities is the correct and safe procedure. To carry out these various steps requires that the patient be put upon the table, that leg rests of the right sort be present, and that all the outfit pertaining to operation be ready.

These things are constantly being done in apartments and private houses. Nevertheless, the time lost, the risk of everything not being done in a thoroughly careful manner, the annoyance associated with these procedures, the labor and responsibility in which the attending physician is involved are all factors which should act in persuading the patient to have her baby, particularly if it be the first baby, elsewhere than in a private home.

If all goes well, and the patient has abundant reasons for so doing, she may readily be transported to her home in an ambulance after a week.

In many cases where operative procedures are found to be advisable, or where the patient is seized with eclamptic convulsions, or where a cesarean section is indicated for this or for some other particular reason, the time lost in transferring the patient to a sanitarium or hospital often means the death of the baby, not infrequently jeopardizing the welfare of the mother. If the experience in the first confinement shows no abnormality in the size of the pelvis, if that labor was not too long, if annoyances, such as a falling down of the cord or a transverse presentation, or other complication were not experienced, one is fairly or reasonably safe in judging that the second or subsequent confinement may take place at home, because in such instances the duration of the second or subsequent labors, especially with the use of pituitary extract, is diminished on an average to two or three hours.

If, however, the patient had some trouble in her first confinement, if the bones are found to be rather small, or if the cord prolapsed, or if a transverse presentation was present, or if some other anomaly, such as involvement of the kidneys, is again present before any subsequent pregnancy, the hospital offers the only safe place for possible complications.

TWILIGHT SLEEP

On theoretical grounds, and as a result of practical tests, from the very first I questioned the advantage of this method which, even if successfully carried out, merely saves the mother the recollection of some pain, a method, however, which possesses danger for the baby. Why, therefore, should we use it?

When patients came to me asking about "twilight sleep," inquiring whether they might have it, I told them that they might have "twilight sleep," but that the labor would last longer than usual, that there would be an increased amount of risk to the baby, and that the chances of having to use forceps were decidedly increased. When patients heard this, not one made any further demand for the method.

If, on the other hand, a patient is told, for instance: that in lieu of "twilight sleep" a drug which increases the efficacy of the pains can be used (pituitary extract); that there will be an increase in the degree of pain, but that the labor will be shorter; that the chances of having to use forceps will be markedly diminished; and that there will be less danger for the baby—without any exception whatever, patients assent to this, when it is put before them in this frank way. Why then use "twilight sleep?"

"Twilight sleep" is the method introduced from Germany whereby, with the aid of hypodermic injections, repeated at certain intervals, of morphine (or a drug like it) or of scopolamine (or a drug like it), the patient's memory,

after the labor is completed, is affected to such a degree that no incident, no pain experienced during the labor, is supposedly recalled.

The method, even if carried out completely, does not insure, in more than 60 or 65 per cent. of the cases, this so-called "desirable result." There is no rule as to the frequency with which these hypodermic injections are given. During the conduct of "twilight sleep" the physician himself, or his assistant who understands the method, ought to be and should be present during the entire time.

Even if the disadvantages (to be mentioned below) do not show themselves, all of them, in every case, the most that is gained by the use of "twilight sleep" is that on the following day the patient has little or no recollection of the pain which she has suffered during her confinement.

When the method was first being introduced into this country, many of us failed to see wherein lay the advantage. Personally, I have never known of a patient who refused to have a second baby because of the pain which she suffered in her first confinement.

Now that time has passed, the calm judgment of the profession and of the laity seems to be that the advantages of the method are *nil*, and the disadvantages quite serious and notable.

During a labor conducted in this way, the patient suffers pain. The patient is extremely thirsty; after a few administrations of the drug she frequently is very, very restless. As the end of the labor is reached it is necessary, in the largest number of cases, to use chloroform as in the ordinary method of conducting a labor.

It not infrequently requires the services of two or more people to hold the patient perfectly quiet. As a result of the use of these drugs in "twilight sleep" the duration

of the labor is usually increased to a considerable degree, and the help which the patient ordinarily gives in pressing and bearing down with each pain is lost, for the patient does not possess the power to contract her abdominal muscles. As a result, forceps have to be used, that is to say, instruments are needed to extract the child in a much larger proportion of cases than when the "twilight sleep" method is not practised.

After the labor there is often difficulty in making the baby breathe. Half an hour to an hour is necessary, in a large number of cases, to bring the child around to a normal state of activity.

All physicians occasionally give a patient in labor a hypodermic of morphin and atropin, if she seems to be suffering unusually from her labor pains.

Even in the earlier days it was not so unusual, when the labor pains lost their force and power, or if the patient grew tired during a long confinement, to give her a hypodermic of morphine and let her rest for a few hours, hoping (as sometimes occurred) that when the pains came back again renewed force would have been added to them by the rest which the patient had just procured.

Nowadays, pituitary extract should be used in practically all such labors, both the first labor and succeeding ones.

Morphine and scopolamine, the drugs used in "twilight sleep," have the effect of nullifying the power of the uterine contractions, while on the other hand, pituitary extract increases their efficacy. Here is another and very important objection to "twilight sleep."

It has been said that the "twilight sleep" method works beautifully in cases of cardiac dyspnœa, and that the patient's dyspnœa and discomfort are relieved after

two or three injections, and that thereafter the patient's comfort is markedly increased.

We all recognize the value of morphine in cardiac difficulties. It is one of the best cardiac stimulants we know, and surely, when combined with atropine, is one of the best sedatives in cardiac dyspnœa. We have all used it and we all use it in such cases, but one need not call this well-recognized line of treatment "twilight sleep."

It has also been said that in cases of toxæmia of pregnancy the "twilight sleep" method so quieted the patients that the various methods of treatment instituted were well borne by the patient. It is quite out of place to refer to this method of treatment in toxæmia of pregnancy as "twilight sleep," for here again the use of morphine and atropine in eclampsia has been and is one of the finest supports the medical men have had. Hence, we should in these instances speak of the use of morphine and atropine, or morphine and hyoscine, as medical therapeutic agents, long since recognized to be of tremendous value. To call these therapeutic agents "twilight sleep" is a mistake which may do much harm.

Bevan speaks thus of scopolamine and morphine as an anesthetic.

1. "A very dangerous anesthetic, so dangerous that it has now been generally discarded by general surgeons, and is retained only by a few enthusiastic obstetricians, the Freiburg School, and has been exploited as the "twilight sleep." The exploitation has been not only in medical journals, but also in the lay press. A very thorough research on scopolamine and morphine has recently been completed by the obstetric staff of the Michael Reese Hospital in Chicago, and reported by Baer.

"This investigation shows that scopolamine and mor-

phine should be rejected absolutely and finally as too dangerous, not efficient, and as complicating the process, and as threatening the asepsis—in short, the same conclusion that was arrived at by general surgeons some time ago. After scopolamine and morphine had caused a good many deaths, scopolamine and pantopon were substituted, and for a time it was claimed that this combination eliminated the risks; very soon, however, fatalities began to be rapidly reported. Then scopolamine and narcophen were suggested as a safe combination. This has not been employed as yet in a large enough series to warrant final conclusions, but deaths are already being reported, and there is no strong reason to hope that this combination is safer than its predecessors.

2. "Comfort.—No discomfort beyond the giving of the hypodermic injection.

3. "Efficiency.—Not efficient. It must be followed by a general anesthetic in a large proportion of cases.

4. "Control.—After once injected, it is beyond the control of the surgeon, and if a dose has been given which is toxic to that particular patient, little can be done to eliminate it.

5. "It is simple and could be generally adopted.

6. "After-effects on blood tissues and viscera are slight.

7. "Complications—Delirium, sometimes of serious character, is not uncommon. Patients are frequently so dopey and out of their heads that they cannot coöperate with the surgeon or obstetrician.

8. "Reduces immunity to pus microbe organisms."

Instead of having the labor last longer (as it always does by the "twilight sleep" method), instead of being compelled to use instruments in a fairly large proportion of cases (as is the case in "twilight sleep"), the use of pituitary extract

diminishes the duration of labor by one-half, and the use of forceps is of the greatest rarity in properly watched, normally proportioned cases.

These properly selected and normally proportioned cases are the ones which can be recognized as such by measurements and by regular examinations, especially if these be made during the last four to six weeks.

These examinations and various measurements show that such patients have normally proportioned pelvic bones. Such examinations show the head to be well moulded and fixed in the brim.

When these pelvic bone proportions are not normal, when the head in a primigravida is not fixed in the brim, the patient should be warned that the labor may be long and tedious, that instruments may in all probability be used. Often a cesarean section is advised, either before labor begins or after it begins and does not progress satisfactorily. If this advice be refused before labor, labor may be induced at any time before full term.

INSTRUMENTS

Instruments or forceps are used to extract the fœtus if progress is slow, if the mother is unable to deliver herself, or if great urgency or hurry is indicated by some complication or accident or because of the dangerous condition of the mother or of the fœtus.

Forceps or instruments are applied with the strictest aseptic precautions, and the patient is under the influence of an anesthetic. The patient must be put in proper position, she should be properly draped as if for an operation, and the vagina and all the surrounding parts are prepared by douches or by the application of iodine as if an important operation was going to be carried out surgically. The bladder must be empty.

Before forceps may be applied, the neck of the womb must be dilated or thoroughly stretched to allow of passing of the head and body without tearing it.

Before forceps or instruments may be applied, the head of the baby should be firmly engaged and moulded in the bones which mark the entrance into the pelvis of the mother.

If the cervix or neck of the womb is completely dilated, and if the head of the baby is firmly fixed and moulded in the pelvic brim, forceps may be applied with safety. If they are then used forcelessly and cautiously, and if, at the beginning of this operation, the baby is alive and in good condition, a live baby may, in the large majority of instances, be confidently expected.

Extraction of the baby by forceps takes at least from half an hour to an hour; the higher up the baby is, the longer

it takes. The same steps as in normal delivery should be observed, that is, the forceps or tractors are pulled on only at certain regular intervals. The forceps are pulled on in such a direction that the head follows the same curved line of the pelvis as it does in normal delivery. During this manipulation the heart of the baby is being constantly listened to, so that its condition may be judged, because the forceps, no matter how gently applied, exert a certain pressure on the head of the baby which interferes, to a certain degree, with the cerebral circulation.

As the head comes down farther and farther toward the perineum, the forceps are pulled on more and more in a horizontal direction. As the head comes down on the perineum, the forceps are held and pulled on more and more in an upward direction, so that when the occiput of the head is under the symphysis, extraction of the head is brought about exactly as when the patient delivers herself without instruments.

Here on the perineum the same process as in normal cases is carried out. The traction should be gentle, it should be at intervals, it should give rest to the head, it should give a gradual and consistent opportunity to the perineum to be stretched not too hurriedly. Whenever forceps are applied, the patient is under the influence of chloroform or ether or laughing gas. Chloroform should not be used in the toxemias of pregnancy.

The largest number of applications of the forceps are made when the head of the baby is in what is called the midplane, that is, when it has passed through the bony inlet of the pelvis and is about halfway down through the bony pelvis on its course down toward the perineum. Here, after several hours of pain and contractions in the first stage, with the proper degree of dilatation of the cervix,

there follows a period when, after the waters have broken, the uterus is contracting and forcing the baby out through the vagina. A stage of inertia often ensues, that is, the uterus no longer contracts with sufficient power or force. It may contract sufficiently to cause the patient great pain; the patient may cry out, and yet no progress is observed.

In other instances the pains die down, and in some cases almost cease. If this state does not yield to other measures, it is advisable to apply forceps and extract the child. This means great relief to the mother, and prevents the head of the child and its body from being compressed for too long a period, which may interfere with its cerebral and systemic circulation and end in the death of the child. Now, in small doses, the use of pituitary extract adds such power and force to the uterine contractions that, except in urgent cases, the use of forceps is rarely indicated.

There are occasional cases where pituitrin ought not to be used. These are cases, *primigravidæ*, where after good pains the head is not engaged in the brim.

High forceps is the term used to define the application of the forceps when the head is just in or through the brim of the pelvis. Occasionally forceps are applied when the head is not engaged in the brim. Only exceptional indications justify this. Only the most expert hands should attempt it as a "test" to see if birth of the embryo, head first, is perhaps possible.

PITUITARY EXTRACT

Pituitary extract is a fluid put up in ampoules to be administered by hypodermic needle. It is derived from the posterior lobe of the hypophysis gland which is situated in the brain. This drug has the power of increasing the force of uterine contractions when labor has once begun. It has no influence in starting labor. If given in small doses and at intervals of no less than half an hour or longer, it increases the power of the uterine contractions and makes the uterus, when in an atonic state, respond with the same degree of force and power as do normally progressive uterine contractions in a normally progressing labor.

If used carefully and with thorough knowledge of its effects, and if its effects on the individual patient be studied, the uterus can be made to behave just exactly as the physician wants it to act. It is needless to say that this drug is to be used only when normal progress is not taking place, in a case where all the conditions are normal. (By this we mean that the relation between the head and the pelvic bones is absolutely and certainly safe.) The head is supposed to be moulded and through the brim, the cervix is supposed to be dilated, and the patient is supposed to be in the second stage of labor.

If at any time during the second stage of labor the pains cease or grow weaker, or even if the pains continue but no progress is made, then this drug, if injected as directed above, will give the uterine contractions the power which is desired, and labor will progress in a normal fashion to its end.

In conjunction with pituitary extract during the last half or three-quarters of an hour of the second stage, nitrous oxide or chloroform are administered so that the baby is born without knowledge on the part of the patient, and little or no sensation whatever of pain is felt. During the administration of chloroform, pituitary extract has to be given more frequently because the chloroform seems to diminish activity of the pituitary extract.

There are still "halting" opinions as to the advisability of the use of pituitary extract in the first stage of labor. However, I find, from my own experience, that if the first stage of labor is very slow, if the cervix is not dilating properly, and if the head is fixed or moulded in and through the pelvic brim, pituitary extract hastens the progress of the first stage without doing any harm to the child, because the bag of waters is still there and the uterus, in its contractions, does not compress or injure the child.

The idea concerning pituitary extract and its use in the second stage is that by its administration we bring labor to a complete end without the necessity of using instruments. This extract shortens the time of labor, avoids the use of instruments, and carries out the whole process in a thoroughly normal manner. It hurts the patient in no wise. When properly used, it has no effect on the baby, and there is everything in the way of common sense to commend its use in appropriate sluggish cases.

The use of pituitrin constitutes the greatest advance the science of obstetrics has made in many years. Pituitrin, on the one hand, and cesarean section, on the other, represent progress toward ideal conditions for physician and patient.

CESAREAN SECTION

Cesarean section is the term applied to the operation whereby the abdomen is incised and the womb or uterus is also incised. Through this incision the child is extracted from the womb, and this is followed by extraction of the after-birth and the membranes. The entire operation of incising the abdominal wall and extracting the child rarely takes more than a minute and a half to two minutes. A little time is used in sewing the incision in the uterus, and in sewing the incision in the abdominal wall. The incision in the uterus is sewed in the same manner as the incision in any other organ. The various layers of the womb which have been cut through, are brought together. Then the abdomen is closed. The entire operation takes a very short space of time, and is in no wise a dangerous one if done when the physician wants to do it, and not when, after long hours of hopeless labor, he is compelled to do it.

The general public imagine cesarean section to be an operation of last resort. This is due to the fact that for many years and even today, in the hands of certain men, and in some parts of the country, delay takes place in performing this operation so that either the child's life is in danger or the mother herself is in danger. The main idea is to obtain a living child without jeopardizing the life or welfare of the mother. Hence, any condition, any abnormality, any accident which threatens the life of the child in case we wait for normal delivery, or in case we try normal delivery, or in case we try any of the various

procedures for hastening or accomplishing delivery from below, is an indication for cesarean section.

The operation is a perfectly clean one. Even if the patient has been in labor, if she has not been examined too often, or if she has not been examined without thorough aseptic precautions, or if the patient is in good condition, and has not been exhausted, and if the child has not been injured by unsuccessful attempts to bring it out through the normal passages with the aid of instruments, the results are usually and uniformly successful for both mother and child.

There are many cases where one does not know whether cesarean section is a necessity until he has actually given the mother and the womb a chance to deliver the child.

In certain cases, however, the operation is absolutely indicated, for no living child can be born from below because of the small pelvis or its deformities, or because of the presence of tumors.

In other instances the bones are just a little below the normal measurements. The patient may have been in labor for a few hours. Instruments, unwisely or wisely, may or may not have been used, and yet no engagement of the head occurs. One has the choice between the turning of the child or the doing of cesarean section. In other cases, moulding scarcely progresses at all. There is fear that high forceps would endanger the welfare of the child. There is fear that, because of extraction by instruments, there may be grave tears to the vagina, or to the perineum. In all these various procedures the life of the child is decidedly in danger, even if extraction with forceps is successful.

Whenever it is found necessary to crush the child's head in order to extract it, I take this stand: It should never be done if the child is *alive*, for there a cesarean section is

the solution. If the child is *dead*, and only clean examinations or procedures have been tried, the mother is much safer with a cesarean section than with extraction from below, preceded by a preliminary crushing of the head, for here we have to do with probable tears and lacerations of a serious nature.

The ideal principle for cesarean section is to do it when we feel we ought to, and not when the family realize that we have to. This method finds its most absolutely valuable application in those cases where the pelvis of the patient is too small to permit of normal delivery, or where a tumor, such as a fibroid, or an ovarian tumor, produces an obstacle which is practically insurmountable.

There are innumerable cases of malposition, and many so-called "border-line" cases where one has to weigh the chances between the usual question of turning of the child, and instruments, on the one hand, and cesarean section on the other.

Examination and measurements of the pelvic bones often disclose at the first visit that certain cases cannot go through labor with delivery of the child in the normal way. The pelvis is absolutely too small, or certain malformations make the important diameters too short. In other cases, the early measurements make us suspicious. These cases—in fact, all cases—should be examined once a week during the last four weeks. Thus we can judge how the fœtus lies; and if it lies with the head down, whether the head fits into the pelvic brim. If, in cases with small measurements, the fœtus is small, and the head, at full term, fits into the brim firmly, all is well. If the head is large, it may not fit snugly, even if the measurements are normal. Then in women pregnant for the first time, warning must be given; labor may be in-

duced before the expected date; or the patient may go into labor, in the doubtful cases, and if moulding and normal changes do not ensue, then a choice must be made between version (or turning) of the child and cesarean section. Referring simply to the relations between the head and the pelvis, the physician should know, in every case, before labor begins, whether cesarean section is a possibility, a probability or a necessity.

When women are threatened with or seized with convulsions, it is necessary or advisable to induce labor. Inducing labor, as previously explained, means the introduction of bags, filled with an antiseptic fluid, into the cervix. When in place for a few hours, this causes uterine contractions, and labor then progresses in the usual way. This may be a long and protracted thing, and may injure the patient's chances for convalescence, for it is generally recognized that with convulsions the uterus should be emptied. If this conservative method is not followed, then the cervix, or neck of the womb, has to be stretched—stretched with the fingers of the surgeon—a procedure taking anywhere from a half to three-quarters of an hour, after which the membranes are ruptured, and the child is extracted with instruments. Such a procedure is very serious, because it brings about tears of the cervix, and tears of the other tissues, and not infrequently means the death of the child. Therefore, in preference to this method I would advise cesarean section because we are through with the operation in a short time without the tears or injury, and as a rule, the results are excellent.

There are also cases where patients, in the latter few weeks or days, show changes in the kidney function—changes which presage the occurrence of eclampsia or convulsions. One is not sure that they will come on, but one is very fearful

of them. Patients may have swollen hands and feet, they may have headaches, dizziness, nausea or vomiting. If these things come on in various degrees, it is not wise to wait until one is *forced* to interfere. I believe that in many such cases, too, cesarean section offers the ideal method of an early and rapid delivery, for it saves the child, and it affords a far better chance of giving the mother life, and of sparing her injuries which must be repaired afterward, than does the method of delivery from below, even if that method may result without the use of instruments.

This same argument holds good for placenta prævia with viable child, and accidental hemorrhage, and with prolapse of the cord.

I believe that the public should be educated up to the advantages of cesarean section, and be made to realize that it ought to be an operation of choice and selection. Let the public be taught that the procedure is safe, if done early enough and under proper surroundings, then the old fear and superstition will disappear. I know myself, from actual experience, that the average layman thinks that the operation of cesarean section is an operation of last resort and a dangerous one. If this idea, as I said before, is once removed, one of the greatest steps in the practice of obstetrics will have been gained. The convalescence after a cesarean section is practically always a very simple one, such as follows almost any abdominal operation. The patient recovers from the anesthesia quickly, is able to nurse the child, suffers possibly a little more intestinal discomfort than with a normal labor, but in other respects, the whole procedure follows a very normal and easy course.

Cesarean section may be done a second, a third or even a fourth time on the same patient. There is no reason why it should not be done, for the wound heals well, in fact, it

almost always does. There is no reason why the patient may not easily become pregnant any additional number of times, and if the same indication or other indications arise, the procedure may be repeated with perfect safety.

In clean cases which have not gone into labor, or which have not been in labor very long, where the child is well, the mother is well, and hospital and other opportunities are perfectly favorable, cesarean section is the procedure of choice, to make sure of a living child and mother.

I am sure that with the lapse of time, the indications for cesarean section will be gradually increased, so that the operation will be done before we are compelled to; in other words, done to avoid risk of future and subsequent annoyance. It must not be forgotten that innumerable cases which are delivered by turning or by forceps or instruments, especially such as the doctors call "high forceps," are associated not only with grave risks to the mother but with hemorrhage into the brain of the child which, if it does not kill the child within a day or two or three, may leave its brain impaired. In addition to this, the use of instruments —even in the most careful hands—is followed by stretching of the various tissues, displacement of the bladder, displacement of the rectum, tearing of the perineum and other annoyances, and although in careful hands these injuries do not jeopardize the life of the mother, they demand subsequently an operation for repair which may be a very extensive procedure.

ABORTION OR EXPULSION OF THE OVUM

The little ovum or egg grows within the cavity of the uterus which serves as a nest for it. It is attached to the lining of the uterus by a constantly larger pedicle which forms the subsequent placenta. The rest of the ovum, in the first three months, hangs within the cavity of the uterus, supported more or less by the wall of the uterus but not attached to it. Not until after the third month is well over does the outer surface of the ovum become agglutinated to the lining of the uterus in its entire circumference.

The further on after the completion of the third or the third-and-a-half month that the ovum is expelled, the more does the process take on or follow the steps of labor. If, before that period, abortion (expulsion of the ovum) takes place, we are concerned with the expulsion of an egg attached more or less securely at only one part of its circumference to the uterine lining.

If, as a result of any disease in the ovum or in the mother, or if, as a result of some process going on in the development of the embryo, the embryo should die, then it is looked upon by the uterus as a foreign body. The uterus then contracts in efforts to expel it. As a result of these contractions, and of changes in the placental site, the attachment of the ovum finally is loosened, in part, from the uterus, and bleeding takes place at the placental site, the point where the ovum nested.

The more the uterus contracts, and the more it separates the ovum from its attachment to the uterus, the more certain will be the expulsion of the ovum. If the embryo

is dead, the ovum must be and will be expelled, although there are certain rare cases where it is retained within the uterus for weeks or months, constantly changing its form into a conglomerate indistinct mass known as a mole.

Another form is that in which, for one reason or another, changes happen in the attachment of the ovum to the uterus and bleeding occurs, to be followed possibly or probably by subsequent contractions of the uterus. In this type, where bleeding occurs first, and only later does the uterus begin its contractions, it is possible to avoid the expulsion of the ovum in many cases by rest and appropriate medication. In other words, the ovum has been loosened minutely, or only in part, and if the bleeding or partially separated area be given an opportunity to heal, pregnancy may go on uninterruptedly to full term.

One can rarely tell, in the early stages of an impending or threatening abortion, whether this is a possibility, but it should be attempted in all appropriate cases. This means rest in bed, and the administration of drugs and opiates which will stop the bleeding and which will keep the uterus quiet, and not allow it to contract, for continued or repeated contractions will certainly separate the ovum more and more from its attachment to the decidua and uterus.

If, even without much bleeding, the embryo dies, then of course, the expulsion of the ovum is an absolute certainty, though we do not know it at the time.

If drugs and appropriate treatment do not inhibit or prevent this occurrence, then bleeding continues more or less profusely, and the uterus contracts more or less regularly, the patient experiences pain in the back, and then pain in the uterus. The expulsion of blood in smaller or very large amounts is continued, and examination shows the cervix or neck of the womb to be dilating, in other words, the same

process as in labor is going on, but in a very miniature way.

If we are certain that the abortion is inevitable, then it is advisable to pack the cervix and the vagina very thoroughly with iodoform gauze. Drugs are then administered which increase the contractile power of the uterus, the idea being to allow the ovum to be completely separated from attachment to the uterus. As a rule, when this has been accomplished in the course of twenty-four to seventy-two hours, pain ceases, and the bleeding diminishes or ceases entirely. Then, on taking out the gauze under the strictest asepsis, the separated ovum may be expelled, *in toto*, or be extracted *in toto* with placental forceps, or the finger may be introduced into the uterus and separate the ovum, if it is not completely loosened. In many cases the embryo and the egg-shell may be expelled completely without anything in a therapeutic way having been done by the physician. On the other hand, the embryo may be expelled, leaving the egg-shell behind, or the embryo and part of the egg-shell may be expelled, leaving placental tissue attached to the uterine lining. This type of case is known as incomplete abortion. If the ovum is expelled and only placental tissue and decidua remain, bleeding may continue, but rarely profusely, and it is usually stopped by appropriate drugs, or by packing the uterus and vagina with iodoform gauze, or by curettage.

A curettage should never be done when the entire ovum is in the uterus. A curettage should only be done to remove placental tissue and the decidua which latter is the overgrown lining of the gravid uterus. In the previously mentioned type of treatment, whereby with an unexpelled ovum the cervix and uterus are packed with gauze and ergotole or other drugs are given to contract the uterus, one may

leave the patient for twenty-four, forty-eight or seventy-two hours without fear of any severe hemorrhage, which may endanger the welfare of the patient. It must be added that all these procedures, including examination, including the packing of gauze, or the extraction of the ovum with forceps, or curettage, should be done under the strictest aseptic precautions, or else infection of the most severe nature may take place.

Bleedings which threaten to end in abortion have a tendency to occur at the dates when menstruation would have occurred, if no pregnancy had taken place. Some ova are so loosely and insecurely attached to the uterus because of the abnormal character of the lining, *i.e.*, the decidua, that capillaries and small vessels break easily and thus furnish the primary cause for the bleeding which threatens to end in abortion. Sometimes patients do not bleed, but simply have a reddish or brownish discharge for days. This is of the same significance as bleeding, and means that the same treatment is needed to try and save the embryo, as if active bleeding were present. Other patients show spotting of red blood, and not actual bleeding, for a long time before profuse bleeding comes on.

The very moment that a patient, in the early or later months of pregnancy, notices the faintest staining, or the faintest sign of blood, or experiences cramp-like pain, she should go to bed immediately and send for her physician. Then, as stated above, efforts are directed to avoid the continuation of impending abortion, and save the embryo from death and the ovum from expulsion. One never knows in these cases whether he is dealing with a primary death of the embryo followed by spotting or bleeding and by attempts on the part of the uterus to expel it, or whether he is dealing with bleeding from the placental site associated

then or later with attempts on the part of the uterus to repeated contractions. If we knew which of the two forms we were dealing with in every case, we could immediately go on, and take steps to empty the uterus, if we knew that the embryo was dead. Inasmuch as we do not know this, practically all cases must be treated with the purpose of avoiding abortion.

Sometimes, after weeks in bed, with appropriate treatment, bleeding may cease, yet the fœtus is dead, and soon, at some unexpected time, contractions of the uterus take place, dilatation of the cervix occurs, and the ovum and dead embryo are expelled.

An abortion or miscarriage is an unfortunate thing, not only because a potential life is lost, but also because one never knows whether a second or subsequent pregnancy will occur. The changes produced in the uterus, tubes and ovaries after this accident may be sufficient to interfere with fecundation and impregnation. Hence the need for guarding a first pregnancy with especial care. A history of abortion, or premature labor or "labor with dead baby" often antedates what is known as secondary sterility.

PLACENTA PRÆVIA

At whatever point the ovum first settles, at that point develops the subsequent placenta. The ovum, as a rule, settles in the upper part of the uterus known as the fundus. It may settle on the anterior wall, the posterior wall, or the lateral wall, as previously explained. Wherever it originally settles, there the large "mother cake" finally develops.

It occasionally happens that the ovum does not nest itself in the upper part of the uterus, but for some reason or other—probably some alteration in the decidua—it is carried down by the ciliated epithelium toward the lower part of the uterus near the neck. If it settles there and nests itself, then the placenta develops in this lower area of the uterus near the cervix. This is subsequently a very annoying complication.

The upper part of the uterus is large, is of firm muscular construction, and the walls are thick. When the uterus contracts, it does not injure the attachment of the placenta to it. The lower part of the uterus, or the part near the cervix, is much thinner. It is the part which is least adapted to hold the placenta, because it must be stretched first before the head of the baby may pass through, in the process of labor. Therefore, as pregnancy progresses, and the large placenta or "mother cake" develops, if it is situated at the lower part of the uterus near the cervix, it is at a part which is thin, at a part which is stretched by the presenting head in the latter weeks, at a part which stretches as soon as the act of dilatation in the cervix and

lower uterine segment occurs. All this jeopardizes the attachment of the placenta, and very frequently, practically in all cases, long before labor begins, bleeding occurs.

SYMPTOMS

As the date of labor approaches, the painless contractions of the uterus, the stretching of the cervix in the process of rapid growth cause a separation, to a greater or less degree, of the placenta with hemorrhage and bleeding from the placental site. It may be only a slight staining at one time, but eventually the bleeding from it is tremendously large in amount. At any time after the seventh and the seventh-and-one-half month, these bleedings may occur. Their severity depends somewhat on the location of the placenta. It may be situated low down in the uterus, but only so low down that its margin may scarcely be felt by the examining finger. It may be situated much lower down, so that its margin practically comes down close to the opening of the cervix. On the other hand, it may be so situated that the placenta stretches completely across the opening of the cervix and blocks the exit of the fœtus.

Any bleeding occurring within the last two or three months of pregnancy is, in all probability, placenta prævia bleeding, although, as mentioned in the previous chapter, accidental hemorrhage, through separation of the placenta, may take place when the placenta is situated in the fundus. These cases are of the greatest importance, for, in a large number of them the fœtus dies in the act of labor or earlier. The condition once recognized, resolves itself into a question of saving the mother, because the bleeding may at any time be so profound that it endangers her life. The act of labor, whether it occurs normally with the head

down, whether it occurs with the use of instruments, or if turning of the child be done, brings about a serious state, and the patient may be very much exhausted by the loss of blood. An infection may occur more readily, and in a certain number of cases, a tearing or injury of the cervix and the placental site of the uterus may occur.

All such cases should be sent to the hospital, and as said above, the question of viability of the child is no longer to be considered. The important and only consideration is to save the mother. In recent years, a greater and greater tendency to perform cesarean section in such cases has come into acceptance, and I believe that that is the wise and the only thing to do in the last month, especially because, if the child is alive at the time, cesarean section preserves its life.

Remember we are dealing with a placenta or "mother cake" attached to the lower segment of the uterus. It may be a lateral implantation, or what is called a marginal implantation, or what is called a central implantation, and while the lateral is less dangerous than the marginal, and the marginal less so than the central, nevertheless, there is in all three a very grave danger, not only to the child but, as has been said, to the mother.

TREATMENT

When this condition is recognized before the child is viable, the mother may, with a thorough understanding, however, of the risk, remain in bed in a hospital and allow the progress of pregnancy to advance another week, two, or three weeks, until the child is viable, and then may consent to appropriate measures tending to bring on the labor, with the minimum danger. A bag may be introduced into the cervix to start the labor, and it may progress favorably.

On the other hand, the turning of the child and pulling one leg down through the cervix and out through the vagina introduces into the cervix a plug which presses the placenta prævia against the lateral wall, and so limits the hemorrhage. Labor may then be allowed to progress, or it may be ended quickly. These measures must often be carried out in the presence of severe hemorrhage. In some cases the cervix and vagina are packed with sterile or iodoform gauze, and the bleeding ceases. One never knows when the next bleeding is coming. Hence, waiting after one severe hemorrhage has been stopped, in the hope of allowing a much desired child to reach a satisfactory viable age is a distinct risk to be undertaken only in a sanitarium or hospital where at any moment any of the vaginal procedures or cesarean section may be undertaken. After delivery bleeding is often hard to control.

ACCIDENTAL HEMORRHAGE

Wherever the ovum first settles, at that point develops the subsequent placenta or mother cake or after-birth, as we have already said. This placenta acts as a lung for the baby. Here, and through it, and by means of it, exchange is taking place between the elements in the blood of the embryo and the elements in the blood of the mother. The point at which the placenta develops is called the placental site. At this placental site are the large openings of the arteries and veins which bring the blood to and fro, bathing the attached uterine surface of the placenta.

At its margins the placenta is very closely attached to the inner surface of the uterus. This, and the attachment of the placenta to the uterus, keeps the mother's blood, which circulates within the uterine vessels, within the vessels of the uterine wall. If at any time during labor or pregnancy the placenta is loosened, in part or in whole, from the placental site, then the blood is poured out between the placenta and the uterus, separating the placenta from the uterus more and more. This blood has a tendency then to peel its way out between the uterine lining and the membranes attached to the inner surface of the uterus, and if the blood succeeds in peeling this lining sufficiently, the blood will then reach the cervix and make its exit through the vagina, forming what is known as a visible hemorrhage. If, on the other hand, the blood is accumulated between the placenta or membranes and the uterine lining and does not peel off the inner part of the membrane entirely from the uterine lining, the blood will be retained

between the placenta and egg-shell, on the one hand, and the uterus, on the other, and no visible hemorrhage takes place. The danger of either of these procedures is that the placenta is separated from its contact with the uterine lining, and having between it and the uterine lining this field of blood, it no longer continues to functionate as it should. This is a dangerous thing for the mother because of the loss of blood, and a dangerous thing to the embryo because the exchange between it and the normally circulating blood of the mother may stop, and the embryo then dies very quickly.

These accidents may occur before the date of labor is reached, or they may occur during the labor itself. As stated before, the one constitutes what is known as the visible hemorrhage, the other what is known as a concealed hemorrhage. If either one of these two procedures continues and is not stopped by appropriate medication, then to save the mother from severe danger from the loss of blood, the uterus has to be emptied. Only when the uterus is emptied of the fœtus and the membranes and placenta can the uterus contract. The only thing that will stop the bleeding from the placental site is complete contraction of the uterus. The only thing that will allow the uterus to contract completely is to empty it. Any of the various procedures which physicians understand must be undertaken: Induction of labor, forceps, version, cesarean section, etc.

Empty the uterus and then extra procedures must be taken to cause it to contract and stop the bleeding from the placental site and overcome the danger of a severe and fatal hemorrhage. If the fœtus is alive, cesarean section is the ideal method.

LOCATION OF THE FECUNDATED OVUM IN THE TUBE, I.E., OUTSIDE OF THE UTERUS

When the egg is discharged from the ovary, by the aid of the liquor folliculi, it is thrown into the peritoneal cavity, whence it is drawn into the lumen or canal of one tube or the other by the current created in the peritoneal plasma by the ciliated epithelium which lines each tube, all of which we have referred to previously (page 13). The current created by this ciliated epithelium draws the ovum in the direction of the large, trumpet-shaped end of the tube. If the ovum reaches the outer end of the tube, it is then propelled by the cilia themselves into the constantly narrowing caliber of the tube, toward the uterine horn, and through this very narrow uterine end into the uterine cavity. If one tube is diseased and its outer end closed, or if one tube has been removed by operation, the tube of the other side can, if normal, draw up into it an ovum discharged from either ovary, if both are present. The current produced by a normal tube of one side will attract an ovum given off from the ovary of the opposite side if, as just stated, the tube of the opposite side be closed or absent.

Fecundation occurs as a rule, it is supposed, in the outer area of the tube, though it may occur at any point where ovum can be met by spermatozoa. If the progress of the ovum be interfered with during its journey through the tube, or if its course be obstructed by obstacles within the tube lumen, or if the ciliated epithelia at certain points are not acting because of inflammation or other conditions,

the impregnated ovum may settle down at almost any area of the tube and may nest itself there, either very superficially or more deeply, and it may there continue its growth and development, under conditions, however, precarious for itself and especially for the mother.

The rarest of places where the ovum may develop is the ovary. A few recorded instances of the growth of an impregnated ovum in the ovary in which it originated are on record.

An impregnated ovum may develop in the abdominal cavity, having perhaps begun its growth there or having been cast out from the tube after originating its growth in the tubal lining and then taking root afresh. A fair number of cases are recorded where such a development of an ovum has gone to full term. The development of an ovum, anywhere outside of the uterine cavity, is known as an extra-uterine or ectopic gestation. When the ovum is growing in the tube, its outer chorionic layer is entering into a lining not purposed for such an invasion. The wall of the tube is very thin, and does not hypertrophy. In comparison with the uterine muscle wall, it is less than one-twentieth the thickness of the latter hence, as the ovum grows larger it dilates the thin tube wall. The chorionic villi may be very loosely attached to the lining of the tube, or they may grow deeply into the tube wall, so that they grow through it and perforate it; therefore, in the first case the ovum may become loosened from its delicate contact with the mucous membrane lining of the tube and may be cast out of the tube in whole or in part. If it is cast out of the tube in its entirety, very little bleeding may take place from the tubal lining. If it is cast out only in part and chorionic structures are left behind, the tube will bleed into the peritoneal cavity just as does the uterus after incomplete abortion. If the

outer covering of the ovum perforates the tubal wall, bleeding may occur very slowly from the point of perforation. On the other hand, the point at which this perforation is taking place may become so thinned out that the growing ovum, in part or in whole, breaks through, producing a rupture of the tube wall with bleeding of so sudden and complete a nature as to endanger the patient's life. If the bleeding is slow and of an intermittent nature, the blood poured out settles around the tube, or behind the tube and ovary, or behind the uterus and is walled off or separated from the general intra-abdominal cavity by a wall composed of intestine, large and small, and of omentum. Such an accumulation of blood soon has a rather firm feel and can be made out by vaginal examination, but a diagnosis as to its nature is not always readily made. If the blood is poured out in the peritoneal cavity quickly and does not clot readily and is not walled off by an upper enveloping wall of omentum and intestine, this fluid blood may not be appreciated tangibly by the examining fingers in all cases.

In some instances an ovum settles and grows at that part of a tube which is attached to the broad ligament, the part called mesosalpinx. If the chorionic tissues perforate into the broad ligament, bleeding may be marked or slight, but accumulates within the peritoneal folds of the broad ligament forming a large swelling on either side of the uterus and adjacent to it.

The severest injury is produced by the development of an ovum in the narrowest part of the tube, *i.e.*, that part of the tube which runs through the horn of the uterus just before it opens out into the uterine cavity. The continued development of a fecundated ovum at this point leads eventually to the breaking through of the chorionic elements and of the ovum in this area composed of muscle

fibers of great thickness, an area plentifully supplied with blood and large vessels, so that the breaking through or rupturing at this point looks as if a miniature explosion had taken place, so extensive is the destruction and distortion of tissues. The loss of blood, consequent shock, and the difficulty of repair make these cases very severe.

If no bleeding has taken place from an ovum situated in a tube, and no blood has accumulated around such a pregnant tube, the feel to the examining fingers is simply that of a sensitive tube, larger than normal and cystic in feel. It resembles conditions produced by various forms of inflammation of the tube and cystic changes which often occur in ovaries.

SYMPTOMS

When a woman is pregnant in the tube, she usually passes her expected menstrual period, but not always so. She may menstruate to the day, and may lose less than usual or only spot slightly. Usually the patient goes a few days over the menstrual period and then begins to spot. Spotting may be accompanied by indefinite pain on one side. The spotting and slight bleeding may repeat themselves at various intervals, often associated with increased soreness or attacks of colic on one side. Such patients usually think that they are having an early miscarriage, and this is often the opinion of the examining physician and curetting is often advised and done.

If the intra-abdominal bleeding is gradual, it is remarkable what large amounts of accumulated blood may be present in the pelvis, masses as large as an adult head, without causing the patient to take to her bed. These accumulations may have been going on for a period of eight to ten weeks. The reason that miscarriage is often diagnosed is that the

bleedings are sometimes repeated; but rarely profuse, and accompanied by much pain in the uterus. This is due to the fact that the uterus, somewhat enlarged by the presence within it of an overgrown endometrium, attempts to throw out this lining of pregnancy, and ofttimes succeeds as a result of painful contractions on the part of the uterus, associated with the expulsion of blood and the expulsion of the lining of the uterus. The latter is sometimes thrown off as a complete cast of the uterus and, when seen by a patient or a nurse, is considered to be the growing ovum.

In other cases the internal bleedings are repeated at varying intervals, but without collapse on the part of the patient. Each severe internal bleeding is associated with an attack of dizziness or fainting from which the patient recovers without marked shock. Then comes in these cases —or in some instances without such previous mild attacks —an attack of such severity that the patient faints and goes into collapse from the amount of blood lost in the abdomen. Such an attack may occur when the patient is straining at stool, or lifting, or it may come without warning. The accumulations of blood within the pelvis may be of such different degrees of firmness, and so varying in their size and outline, and with such differences of location in the pelvis, that they may simulate almost any condition known to the examining fingers. They may simulate a pregnant uterus thrown backward into retroflexion, or "turned upside down," as the laity understand it. They may simulate tumors of the uterus or tumors of the ovary. They may simulate inflammatory conditions of the tubes and ovaries, or accumulations of pus in any of the pelvic structures. Undoubtedly many cases of ectopic pregnancy, "pregnancy outside the womb," occur without being recognized as such, because the very young ovum is thrown out of the

tube, little bleeding occurs, the patient's menstruation is restored, and thereafter the normal course of events is resumed.

In other instances bleeding has taken place within the tube and around the tube, the ovum has died, no further bleeding takes place, and, in the course of time, all the poured-out blood is absorbed, and perhaps only adhesions are present.

In other cases a quiescent state results, with varying amounts of coagulated blood in the pelvis and, finally, from the rectum, or surrounding intestinal structures, an infection takes place which converts the accumulated blood into an infected mass, sometimes into an abscess.

A pregnancy occurring in either tube, if operation ends without a removal of the entire tube, may repeat itself in the same canal. Having developed on one side it may, in not rare instances, grow in the same way on the other side at another time. Inasmuch as mild infections of the tubal lining are the most frequent causes of extra-uterine gestation, one tube is rarely free of involvement if the other tube has been affected, so that the process which has caused this abnormal location for the nesting of the ovum in one tube may, at a subsequent time, produce the same obstacles on the other side. There are instances where an impregnated ovum was present in the uterus and another in the tube at the same time.

After an extra-uterine gestation a normal pregnancy may occur in the uterus, and often does, but a period of two years should elapse after an ectopic gestation before pregnancy is permitted. This diminishes the probability of the occurrence of the same condition on the other side.

An ectopic gestation may be a first pregnancy, or it may occur after two, three or more previous child-births. An

ectopic gestation is rarely accompanied by the usual signs of pregnancy. The patients are rarely nauseated, and rarely show signs in the breasts. The uterus is practically never much enlarged by an ectopic pregnancy and, in cases that have run along some time after the last menstruation, the small size of the uterus, if it can be made out, speaks against the presence of a normal pregnancy.

In every case of suspected abortion an ectopic pregnancy should be viewed as a possibility. The shorter the period after the last expected menstruation, at which spotting or bleeding begins, the greater should be the suspicion of an abnormal nesting of the ovum.

It is almost superfluous to add that operation is the one and only procedure for such cases of pregnancy "outside of the womb."

EUGENICS

Health implies that a person comes through the various periods of early and adolescent life into the adult stage free of hereditary or acquired diseases and states, fit and able to stand the storm and stress of life with a fair amount of resistance.

When a man and woman marry and beget offspring, the offspring is the result of the union of a cell of the male and a cell of the female, the two uniting in such a way that the tendencies, characteristics, strengths, weaknesses are transmitted in varying degrees and proportions, modified the one by the other.

A disease existing in either one or the other may be transmitted directly or as a tendency. Syphilis in either parent may be transmitted to offspring in varying degrees of virulence. Syphilis must first infect the mother before it is transmitted to offspring. The active spirochæte, if they are transmitted, are always transmitted from the female parent into the growing structure of the embryo and fœtus, so that the child of such parentage is born with the actual syphilitic disease in its blood and tissues and generally not recognized.

Tuberculosis, on the other hand, is practically never transmitted into the blood and tissues of the newly born. What is handed down is the tendency to tuberculosis. All individuals are exposed at all times to invasion by the tubercle bacillus, which we are breathing into our lungs practically all the time. The reason that the majority of people do not develop evident tuberculosis is that

they possess what may be known as immunity. Practically all individuals have been infected by the tubercle bacilli at one period or other in their lives, which have entered the lymph glands and affected one or both lungs; but the inherited immunity plus favorable, but not always, immediate surroundings have stopped the further progress of this disease, and this type of individual is not tuberculous.

Children of tuberculous parents lack this degree of immunity, and such children are liable, at different periods of their lives, to tubercular diseases of joints, lungs, or internal organs. Immunity, therefore, or lack of immunity, may be transmitted. Hence there exists in certain families tendency to malignant disease, tendency to diabetes, gout, etc.

Then comes the huge field of mental and nervous diseases, and the various nerve weaknesses, which may be and are transmitted in varying degrees. Various forms of insanity, mental deficiencies, instability of the nervous system are of course transmitted, inasmuch as, stated above, the newly born is simply a product of two cells, one directly from the structure of the father, and the other directly from the structure of the mother.

The way in which the body takes care of the food which it digests shows in many families distinct alterations from the average, so that a tendency to gout or various so-called rheumatic annoyances may be handed down with the same degree of certainty that a peculiar type of feature or a characteristic type of nose, mouth or chin may be inherited.

The individual is dominated, to a certain degree, by the secretions given out at all periods by some of the so-called ductless glands of the body, among which may be mentioned the thyroid gland, the hypophysis, the thymus,

etc. Certain families are characterized by the fact that one or other of these glands asserts itself by certain physical or mental characteristics, which mark that family indelibly. In other words, that particular race or family is of the thyroid type or the hypophysis type or the thymus type. Hence it may be found that in certain families, running through generations, diseases due to abnormal function of the thyroid gland are frequent. The evidences in the individuals are not always the same, for the simple reason that what is evidenced in one descendant by an over-activity of the thyroid may be evidenced in another member by an under-activity. In other words, a certain vulnerability of this gland is transmitted. The same is true of the hypophysis gland, which controls, to a great degree, the bony formation from birth to full maturity. If this gland under-functionates, the individual develops poorly and in typical cases remains a dwarf. If this gland over-functionates, the individual becomes very large and may form what is known as a normal giant.

Variations in over-activity and under-activity may follow fairly definite lines in certain families, perhaps never, or only occasionally, deviating very largely from what constitutes the type for this particular family. So that in certain families most of the individuals are small, but by no means dwarfs. In other families the individuals, some or all, may be very tall, large, and of great stature, and yet by no means typical giants. In other families the instability of this gland may be so marked that some of the individuals may be big and others very small. To what degree the dominant trait in the way of physical stature produced by this gland may be modified and altered by the inherited characteristics of the other parent, and the degree to which these alterations may be manifested in

children of the same persons, or in other descendants, is a matter which no one can figure out beforehand.

In the sphere of mentality the same holds good. Families in which there is a tendency to mental deficiency, to deviations from the normal in the obedience to law and order; families in whom the inability to say "no" and to resist temptation constitute a weakness which may take on criminal phases as a result of permanent or accidental environment, temptations, etc., are apt to find these weaknesses markedly accentuated, if the other parent, in succeeding generations, evidences like weaknesses—weaknesses which are not ordinarily considered as such.

The most astonishing feature and the one which should show to the thinking mind the inability to predicate the strength or weakness of children, even though we know the characteristics of the parents, grandparents and so on, is the difference in various children of the same father and mother; so that, broadly speaking, many things beside apparently good physical health at the time of marriage must be taken into consideration by those to whom heredity and eugenics are to be made a science. The least that we can do, and what we ought to do and must do, is to see that offspring do not inherit syphilis and are not injured at birth by gonorrhœa in the parents; that the tuberculosis tendency is rendered slight by a previously eliminated history of marked tendency to tuberculosis in the parents; and that the distinct history of mental diseases in either side, or the distinct tendency to the transmission of epilepsy, migraine, etc., is looked for and thoroughly weighed in each and every case.

THE DUCTLESS GLANDS

There are in the body various structures called ductless glands which at all times, from birth on, and certainly so before birth, are secreting and sending into the body and its circulation substances which exert a most profound and specific effect on the body and its various organs.

Some of these glands act most energetically during infancy, some at puberty and later. Most of them are of vital importance during the whole period of life.

We will discuss in a very simple manner those ductless glands which are of importance in developing the body, the mind, and in promoting genital and sexual development up to and through puberty.

These glands secrete substances which are absorbed into the circulation and act upon every structure of the body, exert a specific influence on the various body organs, and control the body functions.

Among the most important glands, the following may be mentioned in a few words. A gland called the **pineal gland** is active in childhood. Its secretion inhibits the development of the sex glands. The pineal gland regresses at puberty. Certain involvements of this gland, which are rare, cause an unusually early development and a precocious puberty.

The **thymus** is a very important gland and its secretion inhibits a very early development of the ovary. At puberty the thymus regresses. In many cases it persists. In other cases the thymus and associated structures result

in what is known as the constitutio lymphatica, a condition which involves the possibility of various annoyances in growth, development and mentality. Such patients have a diminished resistance to infectious diseases.

The **parathyroids** are two very small glands which have a close relation to the excretion of mineral salts. This secretion is important in its action on the nervous system and on the bones.

The **thyroid** is a tremendously important gland. In a general way it may be said that this gland is most important from birth on, because it stimulates metabolism, the heart, and has an intimate relation with two other secretory glands known as the hypophysis and the adrenal. The thyroid secretion promotes skeleton growth and development of the sex glands, and promotes and controls to a remarkable degree the development of the mind. This gland becomes exceedingly active at puberty and has a close relation to the development of the sex glands. It has a marked influence in exciting or depressing the nervous system. It regresses as a rule at the climacterium or change of life period. This gland is situated in the neck.

In the brain is a gland called the **hypophysis or pituitary gland** consisting of an anterior lobe, a posterior lobe and a middle lobe. The secretion of this gland has a marked effect on skeletal growth, and mental and genital development. The secretion of the anterior portion has to do with body and bony growth, and sex development.

The posterior gland is related to the accumulation of adipose tissue and is closely associated with the development of the sex glands. When secreting too much or too little, it has a pronounced influence on the mentality and on the nervous system.

There are other glands in the body but they are of not

such a great importance as regards the conditions which we are to discuss.

The **ovaries** are, naturally enough, among the most important structures with which we have to deal. Firstly, because they produce the ova or eggs which permit of pregnancy; and secondly, because of their relation to the thyroid and other glands, especially the hypophysis.

There are marked differences in anatomical structure between the male and the female. Among the differences is the shape of the pelvic bones. This difference between the male and the female is probably due to the secretion which the ovaries are sending into the system.

At puberty the ovaries develop remarkably. They are responsible for menstruation. Because of the secretion which they send into the body they certainly control, to a very decided degree, the beginning of this most important function of the female organism.

With this slight outline of some of the important glandular secretory organs of the body, we may proceed to a more extended discussion of puberty and the processes which precede it and are associated with it.

DEVELOPMENT OF BODY

When a physician sees an adult patient, the size of the patient, the proportion between the body length and the length of the limbs, the shape of the pelvis, the amount of adipose tissue, certain peculiarities of the skull, hands, or feet, certain mental characteristics, many so-called minor details, such as distribution of hair, trichosis, etc., may attract attention to the existence during infancy, childhood or adolescence, of certain alterations and anomalies of gland function.

The proper development of the body in the earlier years

and up to adolescence is, to a great extent, under the control of the intra-cerebral hypophysis and of the thyroid gland. This development is associated with the ripening of the genital organs and the sexual glands (ovaries) and determines to a great extent the question of stature and genitalism. Many of the glands of the body enter, each through its own particular field of work, and also influenced by its relation to other glands, into the realm of bony growth, ossification of bones, form of the bones, tissue growth, and the mental state.

Premature puberty is often associated with accelerated ossification, for the ovaries have a great effect upon the growth of the skeleton. Thus, the age at which genital maturity or ripening takes place has an important influence on skeleton growth, and early maturity is therefore associated with short legs, for the ovaries elaborate a hormon or secretion which stimulates the process of ossification. The effect of late maturity of the ovaries on the other hand, is to increase the height, especially the length of the legs. All gland functions are naturally stimulated at puberty, and, in addition to the influence which ovarian maturity has on skeletal growth, the influence which the hypophysis gland has at this stage must be taken into consideration. Many of the rapid growths of the body are due to hypophysis activity, and come within the realm of the normal; others do not. Since hypophyseal hyperplasia (overgrowth) may be responsible for the rapid body growth which normally occurs at puberty, an exaggeration of this growth may produce what is known as a "normal giant, an individual well-proportioned, sexually intact, with great physical strength."

The relationship between the ovaries and those other secretory organs which influence the growth of bone is

sufficiently remarkable to attract attention, and castration (removal of the ovaries) is followed by changes in the thyroid, the thymus, and the hypophysis.

Genital Development.—The hypophysis gland and the thyroid bear a most important relation to genital development.

Before adolescence, anomalies of the hypophysis cause as a rule, failure of development of the ovaries, the uterus, and the other structures characteristic of the female. After adolescence, anomalies of the hypophysis result in atrophic (retrograde) changes in the genitalia. The same thing, lack of development of the genitalia, holds true with either giants or dwarfs. In the case of dwarfs there is too little secretion from the hypophysis. In the case of giants there is too much, and yet with either of these alterations genital dystrophy (poor development) occurs. Hence increased or decreased function of the hypophysis in the pre-adolescent stage is productive of failure of full development of the genitalia and the genital glands. We know that decreased function of the thyroid is likewise an important factor in producing failure in complete development of the genital glands. Here, however, care must be exercised to be sure that we are dealing with alterations in these gland structures (hypophysis, thyroid), for we know that other conditions may cause sexual infantilism. The diseases of childhood for instance, if these exanthemata involve the ovaries and uterus, may retard or inhibit the development of the genital structures. Chlorosis (a form of anemia), supposedly related to ovarian function, may, in these and later years, bear a relation to the points under discussion.

As a general proposition, it may be stated that if a girl begins to menstruate at thirteen, fourteen, or fifteen it

shows that ovarian and genital development were probably normal. A patient who answers that she was able to be active and to play at that time and was perfectly well probably suffered from no palpitation, no nervousness, no functional cardiac neurosis, *i.e.*, from no thyroid over-secretion. We repeat, the hypophysis and thyroid bear a most important relation to genital development.

PUBERTY

At puberty, the ovary begins to assert itself actively in the economy. The thyroid likewise begins to enter the field of observation and often attracts attention through periodic states of over-activity. How much the ovary has to do with bringing on these secretory alterations in the thyroid is still unsettled, but, in my opinion, the ovary, which so dominates in many ways the functions of a woman's body and mind, is responsible, because of its relation to the thyroid, for many physical and mental deviations.

The reaction and mutual relation between physiologic functions and altered activity of the ovaries, on the one hand, and the general organism (especially the thyroid) on the other, must be considered. It is interesting to observe the influence of genital and sexual development on the general female organism. We must study the relation of normal and altered ovarian and thyroid activity on the psychic and physical characteristics of women especially at the first onset of menstruation, the period of complete development of the sexual organs.

There is marked development at puberty in the female, which occurs earlier than in the male. This period, from the thirteenth to eighteenth years, is a trying one for the girl, and is characterized by diminished general resistance. The increased blood supply in the genital area and the increased arterial tension produced by the ovaries and their internal secretion may cause at puberty backache, a sense of drawing in the back, sensations of pressure in the pelvis and in the region of the uterus and the ovaries. There is a feeling

of weight and weariness in the lower extremities. Girls may become suddenly pale or red; alternately hot and cold. There are changes in the activity of the intestines, bladder, and stomach. Most marked is an irritability of the nervous system. There may be a tendency to depression and "blues." The nervous system is often affected, even before the establishment of menstruation, and among the symptoms may be headache, lassitude, irritability, rings under the eyes, general discomfort, epigastric pain, loss of appetite, palpitation of the heart, dizziness, weakness, and weight in the lower extremities. All this may last for months and may weaken the general system and diminish its resistance. These symptoms are due to the menstrual stimulus produced by the functionating ovaries which are bringing follicles and ova to full development and are producing a general constitutional hyperæmia. During this period the relation between the ovary and other organs, especially the thyroid gland, is being worked out either easily and harmoniously, or with marked difficulty.

Influence of Environment.—Modern culture and social conditions have an unfavorable influence on the sexual organs of women, which finds its expression in the great frequency of gynecologic diseases. Faulty training and manner of life lead to violations of nature's laws, and to injuries in the genital sphere. Even before complete puberty the phantasy of young girls is directed to the sexual processes by improper books, by plays, by social intercourse with men and women whose conversation and bent of mind are not high and wholesome. (Kisch.)

Exciting and depressing psychic influences pass out from the genital sphere. The growing girl recognizes at puberty the meaning of sex. The period from puberty to marriage may be influenced too much by the awakened sexual inclina-

tion. Inactive life, improper nourishment, and the early use of alcoholic drinks influence the psychic mind during this period and tend toward the development of the neurotic state.

The immediate surroundings in which a young girl lives during her sexual development all have an influence. The degree and character of the influences exerted from the genitalia depend on the resistance of the nervous system, or on the temperament, hereditary constitution, education, and training.

Too early entrance into social life, attendance at theater, and the reading of general literature all have a bad sexual effect. All these, added to the knowledge of development and the establishment of the menstrual function, and the character of the child's associations, determine the degree to which the hazy and indefinite "sexual instinct" follows a normal or excitable course. Psychologic reaction to the "sexual instinct" at puberty evidences itself in many ways, all of which represent the need of expressing objectively the newly developed inner feeling. Religion and poetry are often the fields in which these longings are expressed. Young girls at puberty often give themselves up to enthusiastic admiration and adoration of ideals or concrete factors. The mind of adolescent girls is often occupied with thoughts which concern the objects of their affection. Exciting or immodest literature and plays and the influence of sophisticated associates may start the indefinite, hazy, sexual inclination into a flame.

The Freudians believe in the very great importance of the sexual factor in the psychoses and neuroses, and they explain this great importance by the equal importance which the sexual plays in the mental life of every individual. They believe that there is no other one factor in mental life

that is so dominating; no other one factor that has associated with it such tremendous emotional values; that it predominates even over the instinct of self-preservation (White).

Every child is an egoist and a sensualist during a period before clear thought begins and verbal language is used. Every child occupies himself in dealing with a body of sensations, some of which he finds strangely pleasurable and longs to reproduce (Putnam).

Dreams are representations of suppressed impulses. The dreams of children, and many dreams of adults, are frankly sexual, but their suppression is usually so vigorous that one's natural desires are not permitted to express themselves even in dreams. If the suppressed desires could so disguise themselves that they did not shock us, they could often succeed in presenting themselves to us. This is the origin of symbolism in dreams. The impulses which seek to express themselves through this symbol will always be of two kinds, wishes or fears. Dreams represent the working out of unfinished problems (Scripture).

Every dream contains the hidden fulfillment of a repressed wish, which usually refers to the two great impulses, hunger and love. Freud has shown that certain episodic manifestations of hysteria are simply substitutive gratifications for abandoned masturbation, and it is held that the same holds true for the hysteric dreamy state. Freud says that the contented individual does not indulge in fantasies, and dreamy states represent the individual's wishes. Brill believes that there is a direct relationship between suppressed sexual activities and fantastic day dreams (Brill).

Neuroses at Puberty.—Neuroses and psychoses may develop during puberty in such girls or in individuals living under unsatisfactory conditions of life or under the pressure of constant disturbing or irritating influences. Among

these annoyances Kisch mentions hemicrania, precordial anxiety, epilepsy, imperative concepts, kleptomania, pyromania, and various phobias and anxieties.

The establishment of menstruation sometimes acts well and improves the nervous condition; especially so is this the case in well-developed girls who have not yet menstruated.

The inherited psychopathic tendency shows itself especially at puberty. The neurotic predisposition, kept in the background by the resistance and energy of childhood, takes on a sudden and stormy evolution at the time of the menstrual stimulation and its associated constitutional involvement. Most frequently mania and melancholia are noted; then the morbid ideas associated with imperative concepts and the moral psychoses of puberty, according to Kisch. Hysteria often develops at the time of the establishment of menstruation. Commonly the first hysterical attack occurs in association with the first menstruation; or else the first menstruation brings back a previously existing but vanished hysteria. It is generally of mild form, consisting of attacks of laughter and tears, globus hystericus, and clavus hystericus. Hysteria major rarely occurs during puberty.

Nearly one-half of the cases of hysteria develop between the fifteenth and twentieth years of age. The frequency of hysteria diminishes rapidly after the twenty-fifth year. Bernutz says that one-half of the cases of hysteria in women evidence themselves shortly before or at the first establishment of menstruation. Amenorrhea (absence of menstruation) and dysmenorrhea seem to stimulate the development of this nervous condition. Less frequently it is of the hystero-epileptic type. Associated with this condition are commonly so-called nervous moods, weakness of will,

nervous instability, and functional anesthesias, convulsions, and paralyses.

At the time of puberty there is a tendency in young girls of neuropathic heredity to epilepsy; it occurs suddenly with the first menstruation, and is generally then considered as a fainting fit due to the menstruation, but these attacks recur at each menstruation, and most of these attacks of fainting in association with menstruation prove to be epilepsy.

Among other conditions developing at puberty are migraine and chorea minor. Migraine often first begins in young girls entering puberty between the thirteenth and fourteenth years. Chorea minor, which is a functional disturbance in the motor area of the nervous system, is observed during the period preceding and comprising puberty, and is to be brought into relation to the changes occurring during this period of body development, especially in girls.

The Influence of Heredity.—The surroundings and training of the young girl have much to do with the way in which ovarian activity acts on the brain and nervous system. Heredity, however, plays an all-important part.

A nervous system feebly endowed and without enduring qualities, is acted on with marked force by the conditions which reduce the general health. There may result a neuropathic disposition of the nervous organism which yields readily to severe strains and unusual influences. As Mendel says, a hereditary basis generates a predisposition to mental and nervous instability and produces certain peculiar natures which deviate in thought and action from the average. These individuals with difficulty preserve their nervous equilibrium. Many psychic peculiarities arise from imitation in childhood, through vicious environ-

ment or by faulty training. The cramming in schools plays an essential part only if it forces slightly gifted children to unusual work and puts too great a strain on a weak general system.

The hereditary taint, especially if complicated by anæmia and onanism and infectious disease, may form a basis on which nervous and mental alterations may develop between the twelfth and twentieth years, which alterations are most frequently of an hysterical nature. If children tainted hereditarily are exposed to mental exertion not corresponding to their powers, and if there is combined with this, onanism and great loss of blood at the beginning of the menstrual epoch, a psychosis may develop at the time of puberty.

In the simple forms the disease is generally characterized by hypochondriac depression, and the girls feel themselves incapable of labor. These children are backward at school, sleepless, suffer from headaches, cardiac palpitation, and loss of appetite. They become refractory, disobedient, and disrespectful. These children (unfortunately) are considered as lazy and ill-bred and the real condition is not recognized as pathologic.

The establishment of menstruation is especially liable to excite nervous disturbance in hereditarily neurasthenic and psycopathic girls.

RELATION OF GLAND SECRETIONS TO NERVE AND MENTAL STATES

In all these states the rôle of the hypophysis gland and of the thyroid gland must be first considered.

The thyroid is a gland which in many instances secretes too much for the economy. In other, not so numerous, cases it secretes too little. When the thyroid secretes

excessively it over-stimulates the organism. The heart rapidity is increased, the nervous system is, so to speak, "on edge," digestive troubles become a great deal more marked, there is restlessness, anxiety, and a sensation of fear. The extreme cases, usually associated with increased size of the gland, constitute a condition known as exophthalmic goiter or Basedow's disease, or Graves' disease.

In these most typical cases there is a marked bulging of the eyes, a marked increase in the rapidity of the pulse, and marked neurotic symptoms.

When the gland for a long period secretes too little, the symptoms are opposite in nature. The pulse is slow, there is mental and physical depression, loss of memory, dry skin, and a gradual accumulation of a mucoid material under the skin of the body and particularly of the face.

There are many minor degrees of this so-called Basedow's disease, and these are called hyper-thyroidism. There are also very many minor manifestations of the under-secretion, which are called myxedematous or hypo-thyroidism.

Either of these conditions is very much more frequent in women than in men, the proportions being eight or ten in favor of women.

It is worth while asking why thyroid affections in the form of myxedema and Basedow's disease are so much more frequent in women than in men. Whatever the real explanation may prove to be, it also serves a purpose by giving an explanation for the marked instability of the thyroid in the wide field of hypo-thyroidism and hyper-thyroidism of minor grades, sometimes affecting the genital sphere, the digestive functions, the nervous system, or the psyche.

The close relation between the thyroid and the reproductive functions is beyond question. The points in favor of

these are the following: (1) The greater size of the thyroid in females; (2) the enlargement of the thyroid in menstruation and pregnancy; (3) the tendency to develop goiter during pregnancy; (4) early atrophy of the thyroid after the menopause; (5) loss of sexual appetite in many of the thyroid diseases; (6) 80 per cent. of all goiters, 80 per cent. of myxedemas, and most cases of Graves' disease occur in the female.

Mental sluggishness in young girls with symptoms resembling dementia præcox, and considered as cases of weak-mindedness, may obtain activity by thyroid. The symptoms are not enough to warrant the diagnosis of myxedema, but the dry, scaly skin, dryness of the hair, and coldness of the body suggest the need of thyroid extract.

The secretory activity of the hypophysis also shows many variations. With hypo-pituitarism, too, there are gradations of disturbance, from mild psychoses to extreme mental derangement. There is inability to concentrate, there is impairment of memory. Former powers of mental activity may be restored, with the readjustment of a physiologic balance, through glandular administration. In most cases of hypo-pituitarism sufficient to cause adiposity, deviations from the normal intellectual level may be expected. There may also be drowsiness. Psychic disturbances of varying degree are common.

Starr too finds that neurotic symptoms may be dependent upon disturbances of the hypophysis. Marked changes in the hypophysis cause (1) gigantism, or acromegaly, on the one side, and (2) a craving for sweets, a disturbance in carbohydrate metabolism. Subnormal temperature, slow pulse, dry skin, loss of hair—suggestive of myxedema—and sexual infantilism are marked symptoms of this state. There is a complete lack of sexual desire and impotence.

There are mental changes, such as lack of ambition, indifference to matters of importance, inability to do ordinary work, and a state of mind such as seen with chronic opium habit. The extreme forms are easily recognized. In so-called neurasthenics many minor conditions are probably due to disturbances of this gland. There is a type of neurasthenic who is fat, gaining in weight, has a lack of ambition, craving for sweets, and in all probability some of the nervous manifestations are due to the hypophysis.

These cases may also be improved by thyroid extract, which acts very much like hypophysis extract.

Chlorosis.—Chlorosis is a form of anæmia peculiar to young girls. It is a disease of puberty, with a tendency to recur in later years. The modern opinion believes the weakened blood-forming power to bear a relation to the female sexual organs, since from them stimulation is furnished to the blood-producing structures. Just whether, or how much, a diminished or increased secretion of the ovaries bears a relation to these changes is not definitely settled. An even balance in the economy is dependent on the proper function of the ductless glands. Every change in them acts upon the character of the blood, since it is the blood which takes up the various secretions. In chlorosis there is usually a weakening of menstruation of various degrees down to total disappearance. Menstruation may first begin between the fourteenth or sixteenth years or later. The bleedings are weak and watery. The excessive type is relatively seldom, probably one out of five; it is possible that the excessive flow is due to too much ovarin. A large percentage of chlorotic girls suffer from dysmenorrhea. These pains are sometimes due to the coagulation of the blood in the uterus, as there seems to be a tendency to faster coagulation in all but the most severe cases.

A justification for the statement that chlorosis is due to diminished ovarian secretion is furnished by the effects of ovarian therapy in these cases. It may be considered that in chlorosis, with a failure of proper stimulation of the uterus and its lining, a diminished menstruation prevents thereby an excretion through the menstrual blood of toxins produced at puberty. There may likewise, at this stage, be a certain antagonism between the thyroid gland and the ovary. Since many of the cases of chlorosis present symptoms not unlike those found in Basedow's disease, it is possible that a too greatly diminished secretion of ovarian extract causes a relatively increased amount of thyroid extract to circulate in the blood. The ovarian secretion is a stimulator of blood formation, and protects and nourishes the genital organs. It is possible that those chlorotic patients who take on fat have not alone a diminution in the function of the ovary, but likewise a diminution in the function of the thyroid, while those suffering with the milder symptoms of morbus Basedowi have, with a diminished secretion from the ovary, a relative over-secretion on the part of the thyroid.

Cessation of Menstruation a Symptom or Accompaniment, not a Cause, of Nervous Diseases.—Knowing, then, the relations which the important glands bear to the ovaries and genital functions, and the relation which the ovaries bear to the other glands, we in gynecology must remember to view with suspicion in every case the diagnosis that cessation of menstruation, or anomalies of menstruation as such, are a cause of nervous or mental disease, or vice versa, and must be on the alert to correlate, whenever justified by accurate diagnosis, nervous and mental symptoms on the one hand and disturbances of menstruation or genital abnormalities on the other, by referring both to affections of

the ductless glands, and thus separate ourselves, so far as is correct, from the former fixed ideas concerning hysteria, neurasthenia, and reflex neuroses.

THE HYGIENE OF PUBERTY

The time when menstruation begins and stops, whether early or late, is often an inherited quality in many cases. It is wise to develop the resistance of the body, which is diminished by the onset of menstruation, so that the girl may meet with greater ease the demands which this awakening sexual function makes. The girl should be nourished and hardened.

Nourishment.—The food should contain albumen and should be easy of digestion. There should be four to five meals each day. The food should consist of meat, fresh vegetables, vegetables containing iron, such as spinach, beans and peas. There must be freshly cooked fruit in large amounts. The evening meal should not be too rich or too succulent, and had best consist of eggs, omelet, milk, stewed fruits, etc.

Exercise.—There should be plenty of exercise in the open air; not much if the girl is chlorotic. Simple gymnastics develop the muscles, aid in erect carriage, and develop respiration, circulation, and digestion. Room gymnastics are of very great value, and such work may be done in the gymnasium, or the use of medico-mechanics may be advised.

Clothing.—Clothing ought to be of a kind which does not obstruct the circulation. Corsets for the young are injurious. Clothing must give freedom to breathing, to the thorax and abdomen. There should be no tight bands about the neck or tight garters, and underwear should not irritate the genitalia.

Sleep.—Eight to nine hours of sleep are sufficient and the rule to be followed should be "early to bed and early to rise."

Routine.—A regular routine of life and regulation of work and responsibility is advisable. There should be active walking in the open air. Not too much time is to be spent indoors or at the piano or sewing machine. The use of the bicycle is not advisable, but lawn tennis, skating, swimming, etc., are permitted. Literature should be of a wholesome nature and the child must be watched to prevent the habit of masturbation.

Hydrotherapy.—At morning and night we advise a two-minute cold sponge, 50° to 70°F., or a cold shower bath lasting half a minute. If the girl is anæmic or becomes chilled, administer a glass of hot milk or tea some time before the use of the water. Cold water ought not to be used for chlorotics. Scrofular or rachitic constitutions demand the use of salt baths. These girls are poorly developed and menstruate little or late. Sea baths are of value. It is wise to begin at home with salt baths and to gradually lower the temperature so that the girl may become accustomed to sea bathing in the open air. (Kisch.)

Climate.—The effect of climate in disturbances of menstruation and in nervous conditions, as well as in chlorosis, is very important. These states demand an elevation in the mountains of 3000 feet. This acts well on blood formation and on menstruation, improves the appetite and digestion. If the pulse is irregular and frequent, if there is increased pressure in the arterial system, and if there is little resistance to fatigue, it is better to advise a medium elevation in a wooded country. In winter a mild climate is necessary for anæmic and chlorotic girls.

The skin demands special care, for girls at puberty are often liable to acne, comedones, seborrhea.

In abnormal conditions of the pelvic organs a gynecologic examination should be made per rectum and only when absolutely necessary, for it often has a bad effect on the psychic state. The girls imagine they are extremely sick. Gynecologic examination or treatment may cause erotic attacks and may end in a neurosis.

Education.—The social relations of children at puberty should be closely watched; girls are to be taught mild responsibility, and any morbid tendency toward curiosity in the field of the sexual organs should be diminished. The literature, play, and amusements of growing girls should be observed, and social relations with the opposite sex ought to be controlled. They are not to be over-burdened with mental work; there should be a careful combination of work and relaxation. They should be kept away from society, from the theater, from balls. Education is to be limited to the mental ability of each case. The mental qualities of associates should be noted. The girl at puberty must be kept from excessive religious enthusiasms. Literature of such a nature as does not spoil wholesome illusions is to be selected. Music, painting, etc., are to be considered simply as wholesome relaxations. Attention must be paid to the diet and physical exercise. The food should be of a mixed animal and vegetable nature, with little coffee or tea, with no alcohol. Attention paid to the proper daily evacuation of the bowels is essential.

Corsets, if worn, should not constrict the body and should not contain bones, and must act merely as a support for the skirt. It is easy to support the skirt from the shoulders by suspenders.

In due time the young girl ought to be informed of her normal sexual processes and the meaning of this condition to

health. She must be warned of its importance and its significance as a step in her normal life.

Care During Menstruation.—During menstruation the external genitalia should be washed twice daily with water at 85°F., and no full baths should be taken. Long walks, horseback rides, dancing, etc., should not be indulged in. The menstrual period ought to be a period of rest and only simple easy work should be done. The bladder must be emptied regularly. Diet is to be wholesome and nutritious and free from watery foods, especially free of tea, coffee, wine, and beer. In chlorotics the diet must be extremely full for several days.

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